TOSHIBA

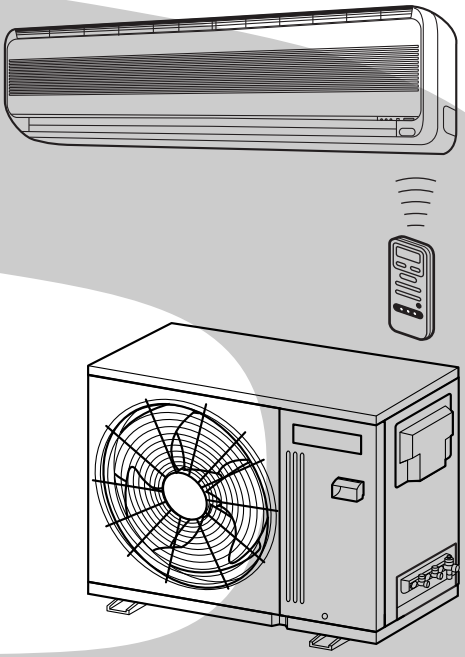
FILE NO. A00-0001

SERVICE MANUAL

AIR-CONDITIONER

SPLIT WALL TYPE

RAS-18YKH-E / RAS-18YAH-E
RAS-18YKH-A / RAS-18YAH-A



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1. SPECIFICATIONS

Item		Model	RAS-18YKH-E, RAS-18YAH-E		RAS-18YKH-A, RAS-18YAH-A	
			Cooling	Heating	Cooling	Heating
Capacity		✱1 (kW)	220–240V		240V	
			5,0	6,35–6,50	5,0	6,50
Power source		Phase	Single			
		(V)	220–240V		240V	
		(Hz)	50			
Power consumption		(kW)	2,03–2,20	2,33–2,52	2,20	2,52
Power factor		(%)	91–81	92–85	81	85
Running current	Indoor	(A)	0,28–0,30	0,28–0,30	0,30	0,30
	Outdoor	(A)	9,82–11,00	11,22–12,10	11,00	12,10
Starting current		(A)	60			
Moisture removal		(lit/h)	2,0			
Noise	Indoor (H/M/L)	(dB)	44/41/38			
	Outdoor	(dB)	54–56	55–57	56	57
Refrigerant	Name of refrigerant		R-22			
	Rated volume	(kg)	1,45			
Refrigerant control			Capillary tube			
Interconnection pipe	Gas side size	(mm)	12,7			
	Connection type		Flare connection			
	Liquid side size	(mm)	6,35			
	Connection type		Flare connection			
	Maximum length (of one way) ✱2	(m)	15			
	Maximum height difference		6			
	Indoor unit / Outdoor unit	(m)				
Codensate drain pipe	Outer diameter	(mm)	16			
INDOOR UNIT			**RAS-18YKH-E / RAS-18YKH-A**			
Dimension	Height	(mm)	298			
	Width	(mm)	1050			
	Depth	(mm)	180			
Net weight		(kg)	12			
Evaporator type			Finned tube			
Indoor fan type			Cross flow fan			
Air volume	High fan	(m^3/h)	750			
	Medium fan	(m^3/h)	650			
	Low fan	(m^3/h)	550			
Fan motor output		(W)	31			
Air filter			Polypropylene net filter (Washable)			
OUTDOOR UNIT			**RAS-18YAH-E**		**RAS-18YAH-A**	
Dimension	Height	(mm)	690			
	Width	(mm)	880			
	Depth	(mm)	310			
Net weight		(kg)	65			
Condenser type			Finned tube			
Outdoor fan type			Propeller			
Airflow volume		(m^3/h)	220V	240V	240V	
			3380	3560	3560	
Fan motor output		(W)	65			
Compressor	Model		PH280X3-4MS			
	Output	(W)	2000			
Safety device			Fuse, overload relay			
Auto louver			Yes			
Usable outdoor temperature range		(°C)	11 to 43	–10 to 21	11 to 43	–10 to 21

Specifications are subject to change without notice.

Note : *1

- Capacity is based on the following temperature conditions.

Temperature \ Condition		JIS C9612-1994	
		Cooling	Heating
Indoor unit inlet air temperature	(DB)	27°C	20°C
	(WB)	19°C	—
Outdoor unit inlet air temperature	(DB)	35°C	7°C
	(WB)	24°C	6°C

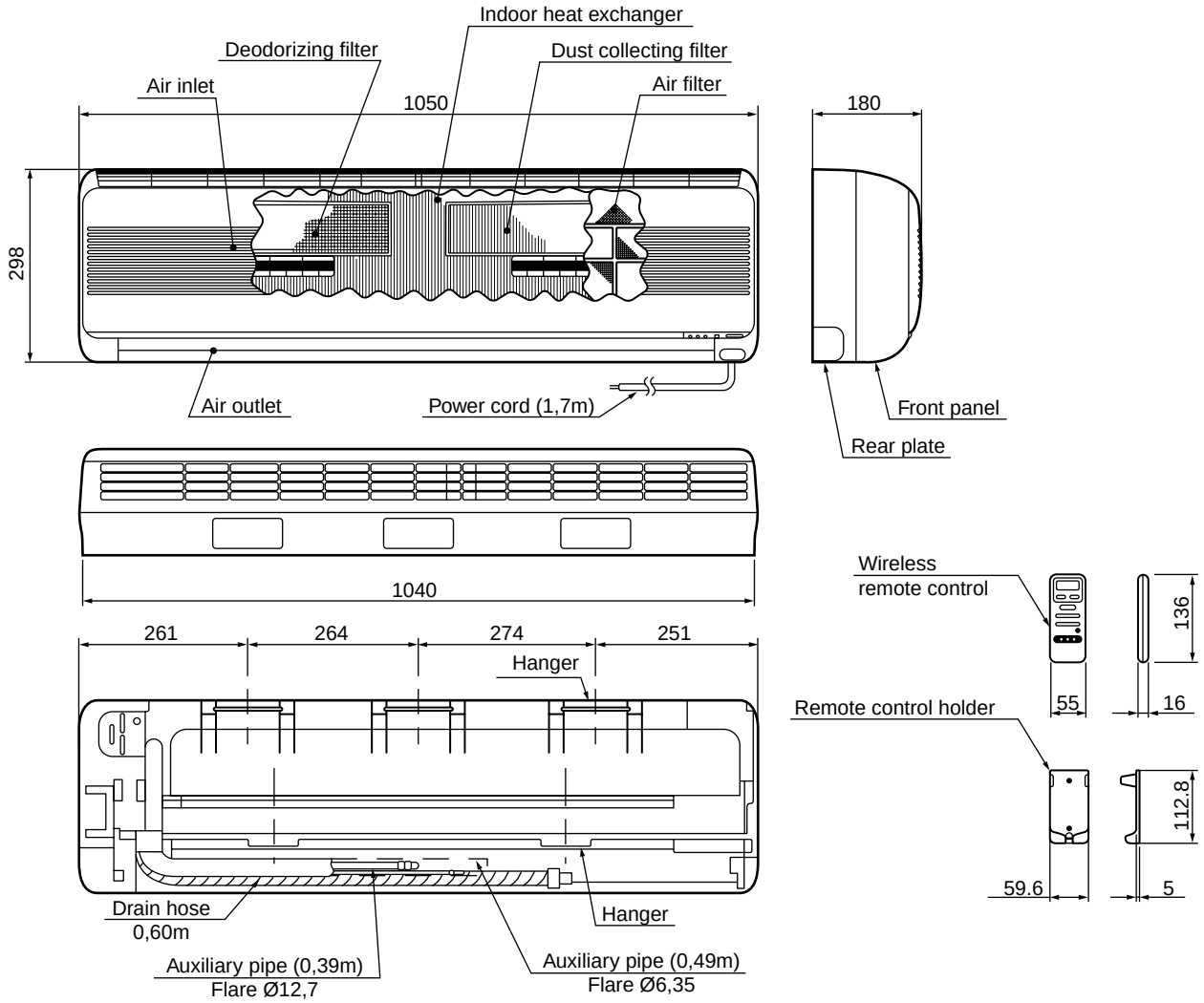
Notes : *2 CHARGELESS

- No additional refrigerant required.
- This air conditioner accepts a connection piping length of up to 15m and a head of up to 6m.
- There is no need to add the refrigerant as long as the total length of the connection piping is up to 15m.

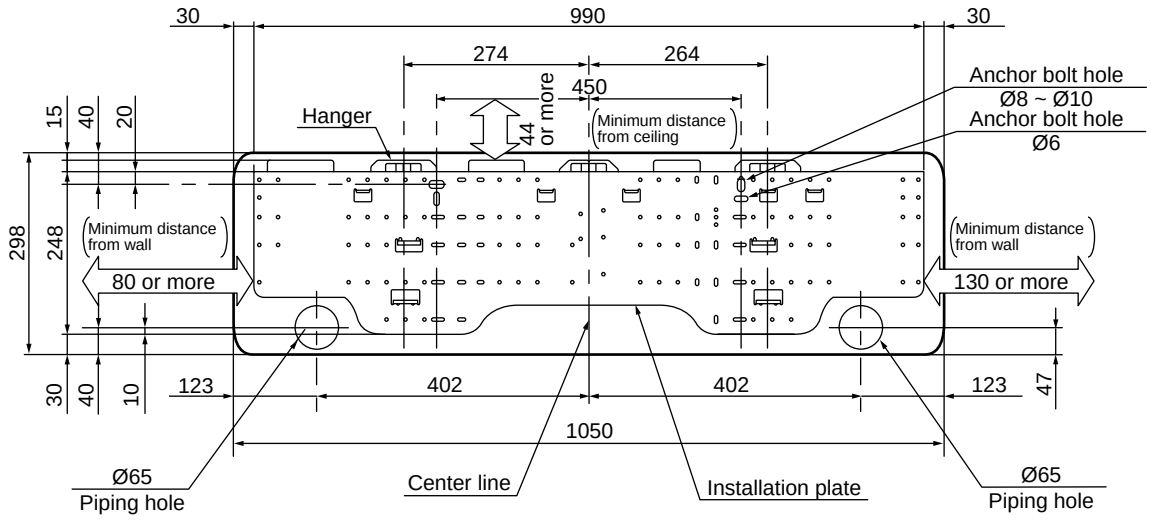
2. CONSTRUCTION VIEWS

2-1. Indoor Unit

RAS-18YKH-E, RAS-18YKH-A

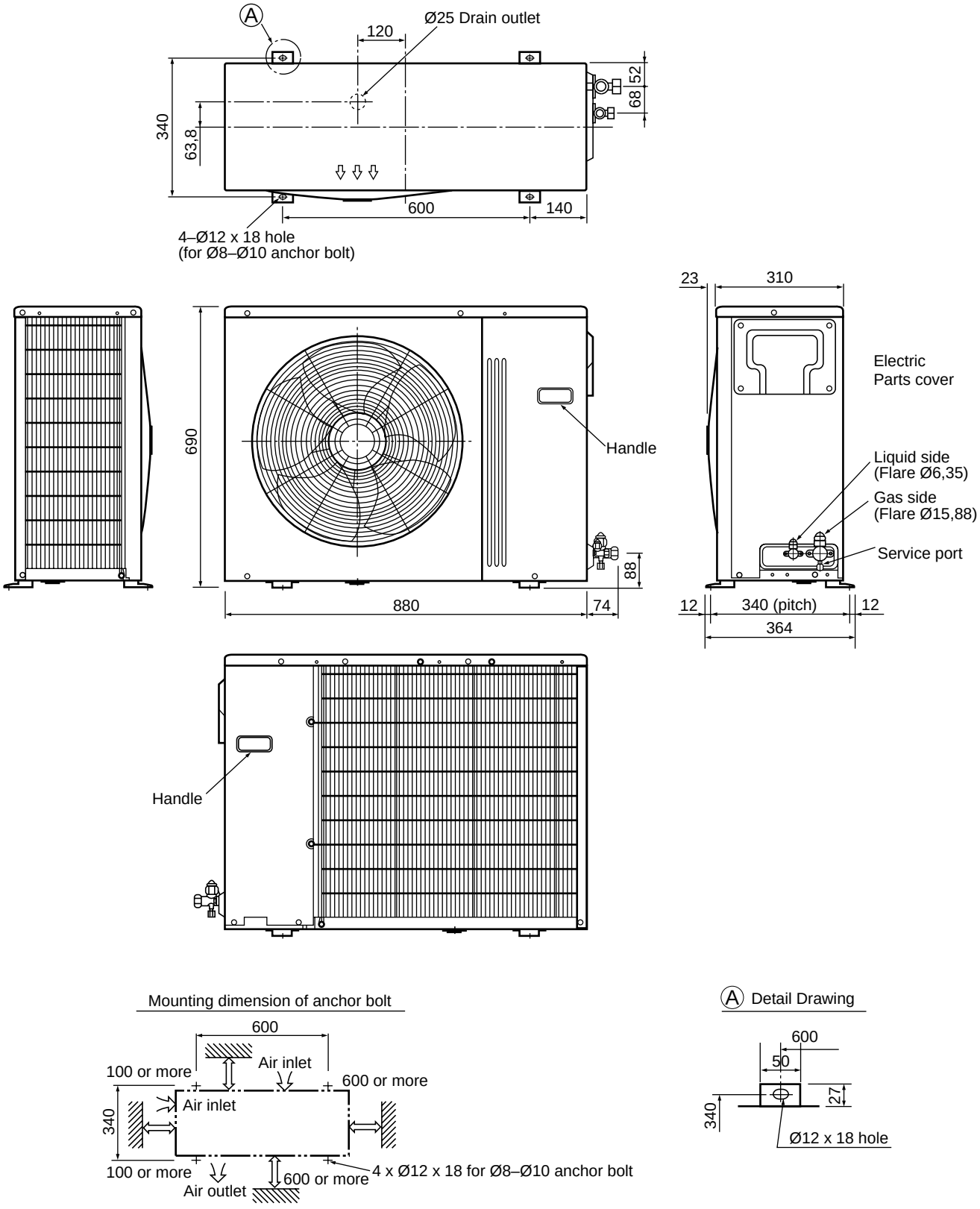


Detail of installing dimensions of the indoor unit

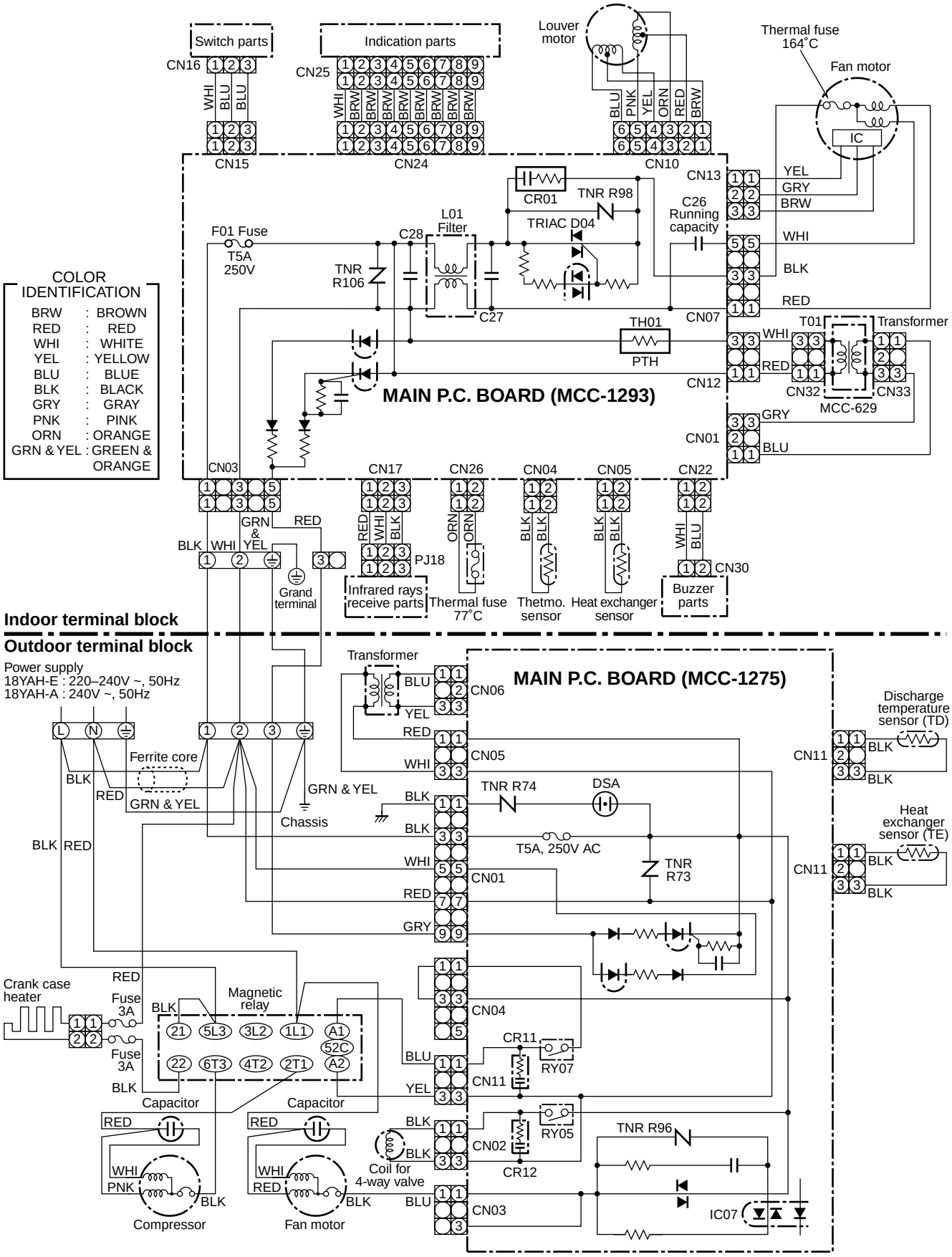


2-2. Outdoor Unit

RAS-18YAH-E, RAS-18YAH-A



3. WIRING DIAGRAM



4. SPECIFICATIONS OF ELECTRICAL PARTS

4-1. Indoor Unit

RAS-18YKH-E, RAS-18YKH-A

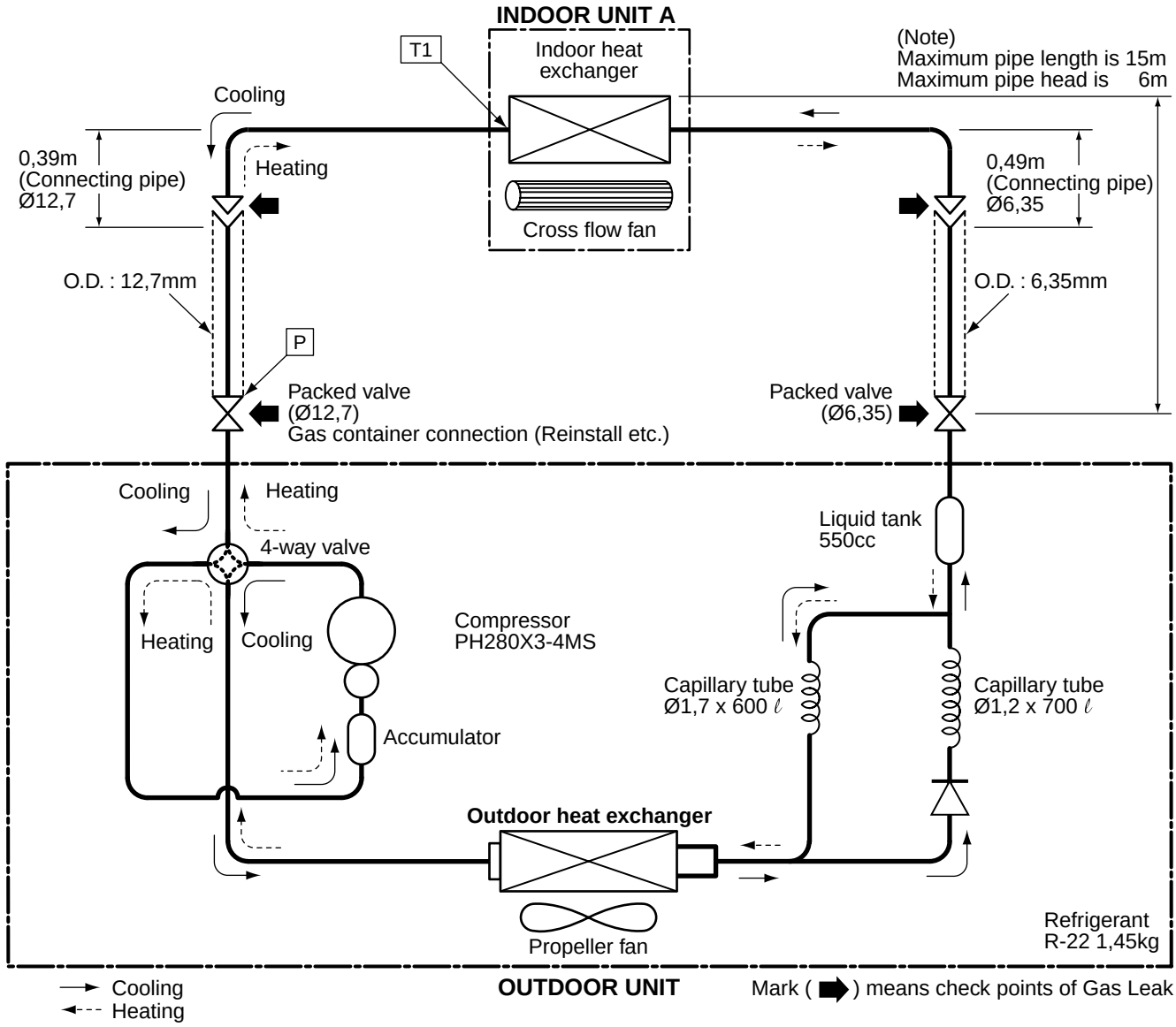
No.	Parts name	Type	Specifications		
1	Fan motor (for indoor)	AFP-220-31-4B	Output (Rated) 31W, 2poles, DC35V, 19W		
			Winding resistance (Ω) (at 20°C)	Red-Black	White-Black
				267,8	147,7
2	Thermo. sensor (TA-sensor)	(microprocessor)	10kΩ at 25°C		
3	Transformer (T01)	TTZ	MCC-629		
4	Microcomputer	TMP87CK40AN			
5	Heat exchanger sensor (TC-sensor)	(microprocessor)	10kΩ at 25°C		
6	Line filter (L01)		25mH, AC 0,7A		
7	Diode (DB01)	KBP06M			
8	Capacitor (C01)	ECAIEHG222E	220µF, 25V		
9	Fuse (F01)	MT3	T5A, 250V		
10	Varistor (R98, R106)	15G431K	430V		
11	PTH (TH01)		82Ω		
12	Louver motor	MP35EA7	Output (Rated) 2W, 10poles, 1phase DC12V		

4-2. Outdoor Unit

RAS-18YAH-E, RAS-18YAH-A

No.	Parts name	Type	Specifications		
1	Compressor	PH280X3-4MS	Output (Rated) 2000W, 2poles, 1phase, 220–240V, 50Hz		
			Winding resistance (Ω) (at 20°C)	Red-Black	White-Black
				1,35	2,68
2	Fan motor (for outdoor)	MMF-230-65C	Output (Rated) 65W, 6poles, 1phase, 220–240V, 50Hz		
			Winding resistance (Ω) (at 20°C)	Red-Black	White-Black
				71,2	139,0
3	Running capacitor (for fan motor)	SK45FMP	AC 450V, 3,5µF		
4	Running capacitor (for compressor)	SK42CMP45U1	AC 420V, 45µF		
5	Solenoid coil (for 4-way valve)	LB60012	AC 200/240V		
6	Thermo. sensor	TE, TD	10kΩ at 25°C		
7	Case heater		240V, 28W		
8	Magnetic switch	FC2S	3a1b		
9	Transformer	FT67	220–240V		
10	Microcomputer	TMP470840			
11	Varistor (R73, 74, 86)	15G471K	470V		
12	Fuse (F01)	MT3	T5A, 250V		

5. REFRIGERANT CYCLE DIAGRAM



50Hz		Standard pressure P (kg/cm²G) 18YAH-E, A	Surface temp. of heat exchanger interchanging pipe T1 (°C) 18YKH-E, A	Fan speed (indoor)	Ambient temp. conditions DB/WB (°C)	
					Indoor	Outdoor
Heating	Standard	21,0	53,0	High	20/–	7/6
	High temperature*1	20,5 to 25,5	52,0 to 61,0	Low	27/–	21/15
	Low temperature	17,0	45,0	High	20/–	–10/–10
Cooling	Standard	3,0	9,0	High	27/19	35/24
	High temperature	3,5	11,0	High	32/23	43/26
	Low temperature	2,5	1,5	Low	21/15	21/15

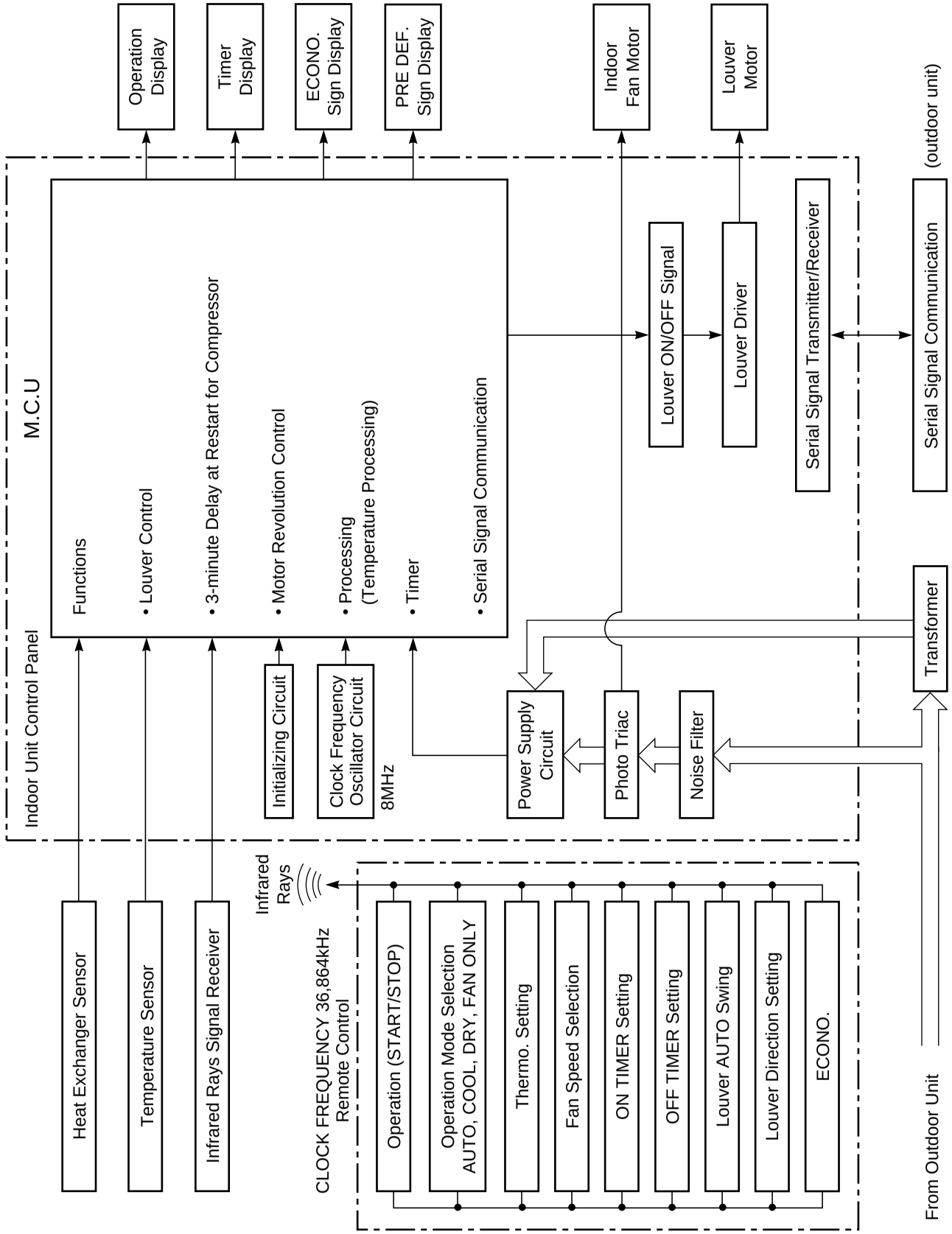
Note :

- Measure the heat exchanger temperature at the center of U-bend. (By means of TC sensor.)

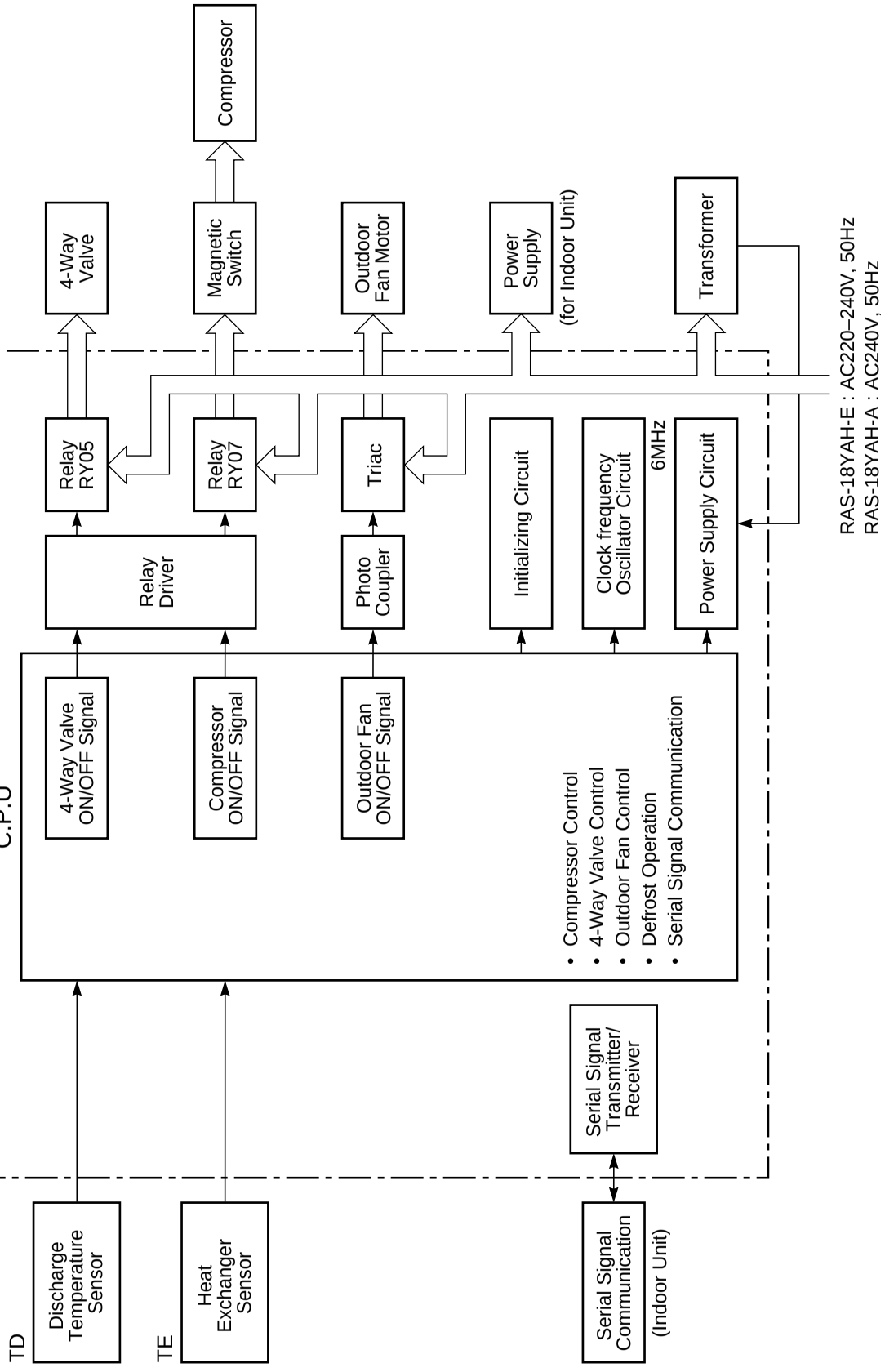
*1 • During heating overload, the high temperature limit control operation is included.

6. CONTROL BLOCK DIAGRAM

6-1. Indoor Unit



6-2. Outdoor Unit



7. OPERATION DESCRIPTION

7-1. FAN ONLY Operation

(MODE of the remote control : FAN ONLY)

(1) Fan speed setting

1) When the FAN is set to AUTO, the indoor fan motor operates as shown in Fig 7-1-1.

2) When the FAN is set to LOW, MED, or HIGH, the indoor fan motor operates with a constant in volume as listed in Table 7-1-1.

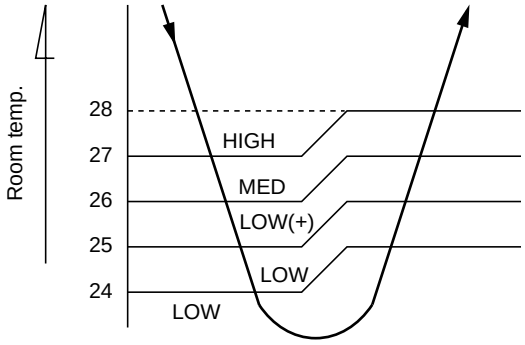


Fig. 7-1-1 Auto setting of air volume

Table 7-1-1 Manual setting of FAN SPEED

Indication of FAN SPEED	HIGH Air volume (m^3/h)
LOW	550
MED	650
HIGH	750

(2) Once the setting is made, the operation mode is memorized in the microcomputer so that the same operation can be effected thereafter simply by pushing the START/STOP button.

7-2. COOL Operation

(MODE of the remote control : COOL)

(1) Compressor, 4-way valve, outdoor fan and operation display are controlled as shown in Fig. 7-2-1.

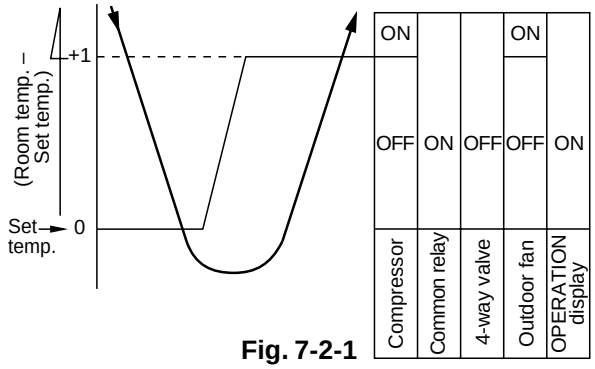


Fig. 7-2-1

(2) A cool operation is carried out when the indoor microcomputer sends the operation signal to the outdoor microcomputer.

1) When the FAN is set to AUTO, the indoor fan motor operates as shown in Fig 7-2-2.

2) When the FAN is set to LOW, MED, or HIGH, the indoor fan motor operates with a constant in volume as listed in Table 7-1-1.

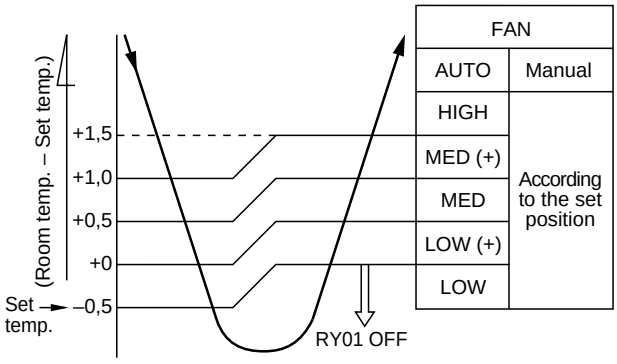


Fig. 7-2-2

(3) Once the setting is made, the operation mode is memorized in the microcomputer so that the same operation can be effected thereafter simply by pushing the START/STOP button.

7-2-1. Louver Control

(1) By pushing the SET button of the remote control during the operation, the louver can be set to the desired position.

And the louver position is stored in the micro-computer, the louvers will be set to the position automatically at the next operation.

(2) When the AUTO button is pushed, the louver vertically swings within range of 25deg.

7-3. HEAT Operation

(MODE of the remote control : HEAT)

(1) Compressor, 4-way valve, outdoor fan and operation display are controlled as shown in Fig. 7-3-1.

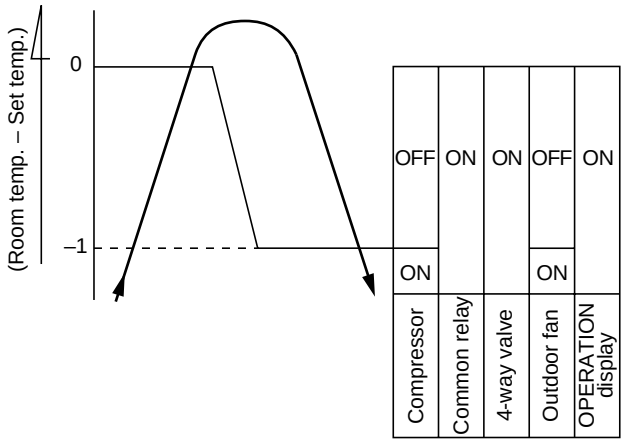


Fig. 7-3-1

(2) A heat operation is carried out when the indoor microcomputer sends the operation signal to the outdoor microcomputer. The indoor fan motor operates as shown in Fig. 7-3-2, when the FAN is set to AUTO.

The motor operates with a constant air volume as listed in Table 7-1-1, when the FAN is set to LOW, MED, or HIGH.

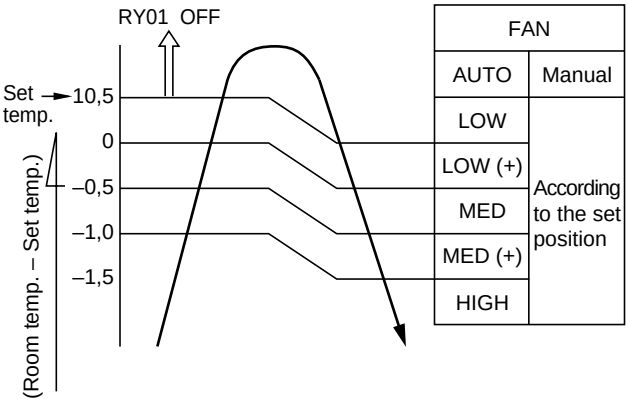


Fig. 7-3-2

(3) Once the setting is made, the operation mode is memorized in the microcomputer so that the same operation can be effected thereafter simply by pushing the START/STOP button.

7-3-1. Louver Control

(1) By pushing the SET button of the remote control during the operation, the louver can be set to the desired position.

(2) When the AUTO button is pushed, the louver vertically swings within range of 25deg.

And the louver position is stored in the micro-computer, and at the next operation, the louvers will be set to the stored position automatically at the next operation.

7-3-2. Cool Airflow Control

(1) If the indoor heat-exchanger temperature detected by the indoor heat-exchanger sensor is 16°C or below, the indoor fan stops and if the temperature rises to 26°C or above, the fan is restarted.

Details are in 7-8.

7-4. AUTO Operation

(MODE of the remote control : AUTO)

(1) One of the 3 modes, Cooling, Fan only and Heating is selected according to room temperature at which operation is to start, as shown in Fig. 7-4-1. The Fan mode will continue until room temperature reaches a level at which another mode is selected.

7-4-1. Temporary Auto

When the TEMPORARY button is pushed, the set temperature is fixed at 24°C and controlled in accordance with the chart shown in Fig. 7-4-1.

(Room temp. – Set temp.)		
+3	Cooling mode	(The same cooling mode as the room temperature control is set at set temp. –3˚C)
–3	Heating mode	(The same heating mode as the room temperature control is set at set temp. +3˚C)

Fig. 7-4-1

7-5. ECONO. Mode

When the ECONO. button is pushed, during COOL, HEAT and AUTO operation, the OPERATION display is turned off and the ECONO. display is lit and the indoor unit operates quietly and mildly with controlling airflow.

7-5-1. Cooling

(1) In the ECONO. mode, the set temp. by the remote control is changed automatically as shown in Fig. 7-5-1.

(2) Fan speed → LOW

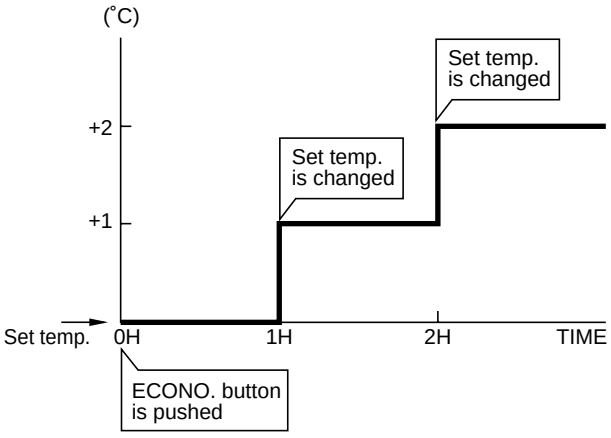


Fig. 7-5-1

7-5-2. Heating

(1) In the ECONO. mode, the set temp. by the remote control is changed automatically as shown in Fig. 7-5-2.

(2) Fan speed → LOW

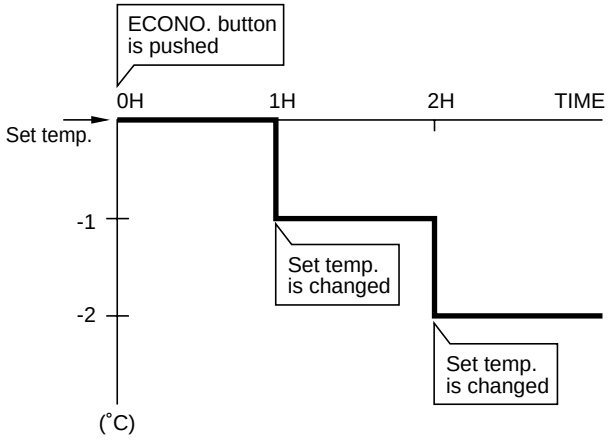
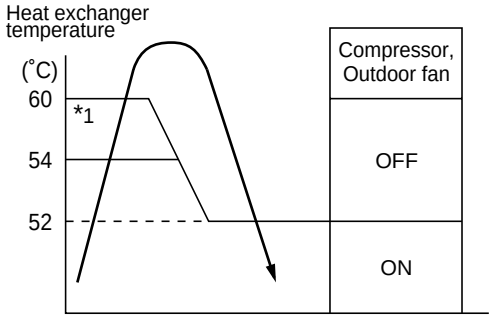


Fig. 7-5-2

7-6. High-Temperature Limit Control (Heating Operation)

The microprocessor detects the indoor heat exchanger temperature so as to prevent exceeding the condensate pressure.

Control is performed as shown in Fig. 7-6-1.



*1 ····· Only outdoor fan is turned off.

Fig. 7-6-1

7-7. Low-Temperature Limit Control (Cooling Operation)

The microprocessor detects the indoor heat exchanger temperature so as to prevent freezing up the indoor heat exchanger.

Control is performed as shown in Fig. 7-7-1.

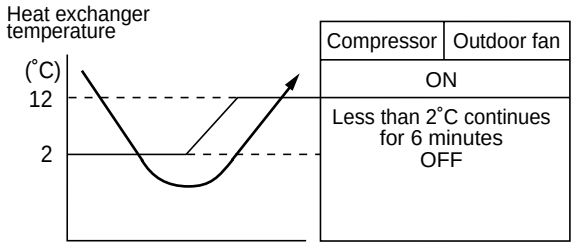


Fig. 7-7-1

7-8. Cool Airflow Prevention Control (Heating Operation)

(1) During the heating operation, the indoor fan speed is controlled automatically in accordance with the indoor heat exchanger temperature to prevent blowing the cool air.

Control is performed as shown in Fig. 7-8-1.

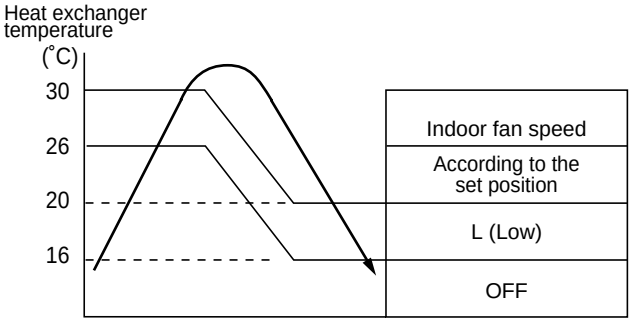


Fig. 7-8-1

(2) As soon as the defrost operation starts, the indoor fan stops.

7-9. Defrost Operation

During heat operation, if the temperature (Evaporating temperature) detected by the outdoor heat exchange sensor (TE :Defrost) lowers by the set degree less than the temperature detected at start time, the operation enters the defrost operation. In this time, the 4-way valve relay and the outdoor fan are turned off. The indoor fan is turned off by the cool air blow-out preventing control of the indoor microcomputer at the indoor side, and "PRE.-DEF." on the remote control goes on.

The defrost operation is automatically reset to the normal operation when the temperature detected by the above-mentioned TE sensor rises up to the set value, or when Max. 12 minutes of the operation time has passed.

8. INSTALLATION PROCEDURE

8-1. Safety Cautions

For general public use

Power supply cord of parts of appliance for outdoor use shall be more than polychloroprene sheathed flexible cord (design H05 RN-F), or cord designation 245 IEC 57.

CAUTION **To Disconnect the Appliance from the Mains Supply.**

This appliance must be connected to the mains by means of a circuit breaker or a switch with a contact separation of at least 3 mm.
If this is not possible, a power supply plug with earth must be used. This plug must be easily accessible after installation. The plug must be disconnected from the power supply socket in order to disconnect the appliance completely from the mains.

REQUIREMENT OF REPORT TO THE LOCAL POWER SUPPLIER

Please make sure certainly that the installation of this air conditioner will be reported to the local power supplier before installation.
If you have any obscure problems (or if the power supplier does not accept the installation) of this appliance, service agency will take adequate countermeasures.

DANGER

- FOR USE BY QUALIFIED PERSONS ONLY.
- TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES ARE OFF. FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK.
- CONNECT THE CONNECTING CABLE CORRECTLY. IF THE CONNECTING CABLE IS CONNECTED BY WRONG WAY, ELECTRIC PARTS MAY BE DAMAGED.
- CHECK THE EARTH WIRE IS NOT BROKEN OR DISCONNECTED BEFORE INSTALLATION.
- DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION.
- TO PREVENT OVERHEATING THE INDOOR UNIT AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2M.) FROM HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTORS, FURNACE, STOVES, ETC.

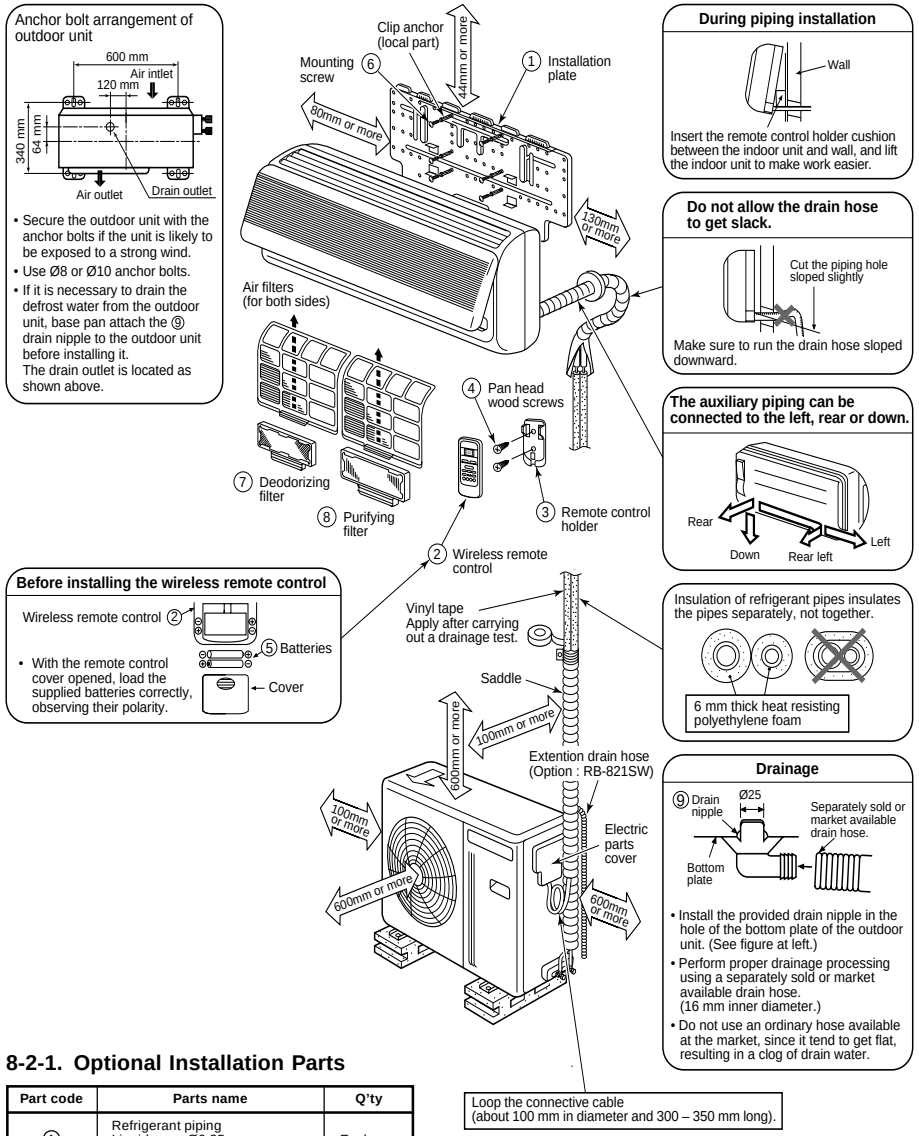
WARNING

- Never modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches.
- Do not install in a place which cannot bear the weight of the unit. Personal injury and property damage can result if the unit falls.
- Before doing the electrical work, attach an approved plug to the power supply cord. And make sure the equipment to be earthed.
- Appliance shall be installed in accordance with national wiring regulations.

CAUTION

- Exposure of unit to water or other moisture before installation will result in an electrical short. Do not store in a wet basement or expose to rain or water.
- After unpacking the unit, examine it carefully for possible damage. If you detect any damage, do not install the unit. Contact your Toshiba dealer immediately.
- Do not install in a place that can increase the vibration of the unit. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb user's neighbors.
- To avoid personal injury, be careful when handling parts with sharp edges.
- Please read the installation manual carefully before installing the unit. It contains further important instructions for proper installation.

8-2. Installation Diagram of Indoor and Outdoor Units


Anchor bolt arrangement of outdoor unit
600 mm
Air intlet
120 mm
340 mm
64 mm
Air outlet
Drain outlet
• Secure the outdoor unit with the anchor bolts if the unit is likely to be exposed to a strong wind.
• Use Ø8 or Ø10 anchor bolts.
• If it is necessary to drain the defrost water from the outdoor unit, base pan attach the ⑨ drain nipple to the outdoor unit before installing it. The drain outlet is located as shown above.
Clip anchor (local part)
Mounting screw ⑥
① Installation plate
44mm or more
80mm or more
130mm or more
Air filters (for both sides)
④ Pan head wood screws
⑦ Deodorizing filter
⑧ Purifying filter
③ Remote control holder
② Wireless remote control
Before installing the wireless remote control
Wireless remote control ②
⑤ Batteries
Cover
• With the remote control cover opened, load the supplied batteries correctly, observing their polarity.
Vinyl tape
Apply after carrying out a drainage test.
Saddle
100mm or more
600mm or more
Extention drain hose (Option : RB-821SW)
Electric parts cover
100mm or more
600mm or more
600mm or more
Loop the connective cable (about 100 mm in diameter and 300 – 350 mm long).
During piping installation
Wall
Insert the remote control holder cushion between the indoor unit and wall, and lift the indoor unit to make work easier.
Do not allow the drain hose to get slack.
Cut the piping hole sloped slightly
Make sure to run the drain hose sloped downward.
The auxiliary piping can be connected to the left, rear or down.
Rear
Down
Rear left
Left
Insulation of refrigerant pipes insulates the pipes separately, not together.
6 mm thick heat resisting polyethylene foam
Drainage
⑨ Drain nipple
Ø25
Separately sold or market available drain hose.
Bottom plate
• Install the provided drain nipple in the hole of the bottom plate of the outdoor unit. (See figure at left.)
• Perform proper drainage processing using a separately sold or market available drain hose. (16 mm inner diameter.)
• Do not use an ordinary hose available at the market, since it tend to get flat, resulting in a clog of drain water.

8-2-1. Optional Installation Parts

Part code	Parts name	Q'ty
Ⓐ	Refrigerant piping Liquid : Ø6,35 Gas side : Ø12,7	Each one
Ⓑ	Pipe insulating material (Polyethylene foam, 6mm thick)	1
Ⓒ	Putty, PVC tapes	Each one

8-3. Indoor Unit

8-3-1. Installation Place

- A place which provides the spaces around the indoor unit as shown in the above diagram.
- A place where there is no obstacle near the air inlet and outlet.
- A place which allows an easy installation of the piping to the outdoor unit.
- A place which allows the front panel to be opened.

CAUTION

- Direct sunlight to the indoor unit wireless receiver should be avoided.
- The microprocessor in the indoor unit should not be too close to r-f noise sources. (For details, see the owner's manual.)

Remote control

- A place where there are no obstacles such as a curtain that may block the signal from the indoor unit.
- Do not install the remote control in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Keep the remote control at least 1 m apart from the nearest TV set or stereo equipment. (This is necessary to prevent image disturbances or noise interference.)
- The location of the remote control should be determined as shown below.

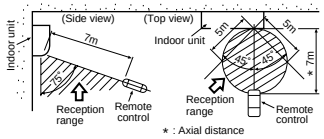


Fig. 8-3-1

8-3-2. Installation Parts

Part with an asterisk (*) is packaged with outdoor unit.

Part No.	Name of parts (Q'ty)	Part No.	Name of parts (Q'ty)
①	Installation plate x 1	⑥	Mounting screw Ø4x 25 ℓ x 8
②	Wireless remote control x 1	⑦	Deodorizing filter x 1
③	Remote control holder x 1	⑧	Purifying filter x 1
④	Pan head wood screw Ø3,1 x 16 ℓ x 2	⑨	Drain nipple * x 1
⑤	Batteries x 2	Others	Name
			Owner's manual
			Installation manual

8-3-3. Cutting a Hole and Mounting Installation Plate

Cutting a hole

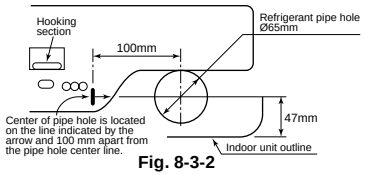

Hooking section
100mm
Refrigerant pipe hole Ø65mm
47mm
Center of pipe hole is located on the line indicated by the arrow and 100 mm apart from the pipe hole center line.
Indoor unit outline

Fig. 8-3-2

When installing the refrigerant pipes from the rear.

Determine the pipe hole position using the installation plate, and drill the pipe hole Ø65 mm slightly downward.

NOTE

When using the drill to pierce the wall that contains a metal lath, wire lath or metal plate, be sure to use a pipe hole brim ring sold separately.

Mounting the installation plate

For installation of the indoor unit, use the paper pattern on the back.

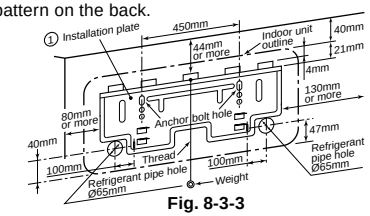


Fig. 8-3-3

When the installation plate is directly mounted on the wall

1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up the indoor unit.
2. To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as illustrated in the above figure.
3. Install the installation plate horizontally in the wall.

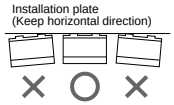


Fig. 8-3-4

CAUTION

Failure to firmly install the unit may result in personal injury and property damage if the unit falls.

1. Adjust the lateral position of the installation plate without changing the height, so that each screw hole in the plate comes in the center of a pillar or stud.
2. Make pilot holes with a bit to prevent the studs from cracking, and then drive the screws into the holes and tighten.

CAUTION

When installing the installation plate with mounting screw, do not use the anchor bolt hole. Otherwise the unit may fall down and result in personal injury and property damage.

• In the case of a reinforced concrete wall

(1) In the selected area on the reinforced concrete wall, bore holes at intervals of 450 mm, and drive clip anchors or hole in anchors into them.

(2) Attach the installation plate to the wall by screwing bolts or nuts into the anchors. However, in the case where hole in anchors are used, the depth of the holes should be adjusted so that the nut-heads extend no more than 15 mm.

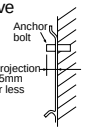


Fig. 8-3-5

- There may be a wire conduit embedded in the wall. Confirm on the blue prints or ask the builder.
- Install the installation plate using 4 to 8 pieces of mounting screw securing four corners with screws.
- Make sure of the proper installation of the installation plate before mounting the indoor unit.

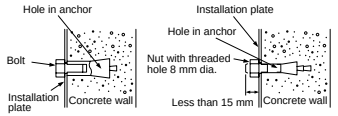


Fig. 8-3-6

• In the case of the pipe on the back

Using the pattern, position the pipe hole, and bore the hole slightly downward.

8-3-4. Electrical Work

Important items of indoor unit wiring

1. For electrical works the wiring and cables must be performed in compliance with national wiring standard or regulation. If incorrect and incomplete wiring is carried out, it will cause an electrical fire or electrical shock.
2. Do not use the inter-connecting cable. Never execute the connection of electrical wiring with other method than the approved one. (exp. use the terminal block etc.)
3. Prepare the interior power supply cord capacity sufficient for starting and usage current of air conditioner.
4. Connect the connecting cable to the terminal as identified with their respective matched numbers on the terminal block of outdoor unit.
5. Fix the cable securely with the cord clamps to the specified position.
6. Do not damage or scratch the conductive core & inner insulator of power supply and inter connecting cables when peeling them.
7. Do not deform or smash the surface of the cables. Do not press or fix the cord and cables firmly with staples, etc.

How to connect the cable

1. Remove the side panel. (2 screws)
2. Remove the electric parts cover and cord clamp.
3. Insert the connecting cable fully into the terminal block and secure it by screw tightly.
   Tightening torque : 1,2 N•m (0,12 kgf•m)
4. Secure the connecting cable with the cord clamp.
5. Fix the electric parts cover and side panel.

How to open the screw cap

- Place your finger on the lower part and push up to open the screw cap.

Fig. 8-3-7

CAUTION

- Be sure to refer the wiring system diagram labeled inside the side panel.
- Check local electrical codes and also any specific wiring instruction or limitation.

How to remove the front panel

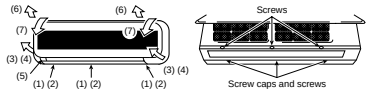


Fig. 8-3-8

(1) Open the screw caps and remove three front panel fixing screws.
(2) Put the screw caps back as they were.
(3) Press the part saying "PUSH" on the air inlet grille to open the air inlet grille.
Remove three black front panel fixing screws.
(4) Close the air inlet grille.
(5) Manually open the vertical air flow louver directly below.
(6) Open the front panel lower portion until it comes in contact with the vertical air flow louver. Lift up the front panel upper portion in a forward diagonal direction to unhook the clicks inside the front panel upper portion.
(7) After unhooking the nails inside the main unit upper portion, rotate the front panel upper portion towards you to remove the front panel from the unit body.

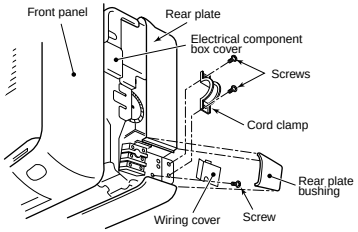


Fig. 8-3-9

Stripping length of connecting cable

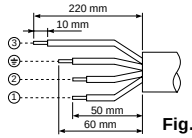


Fig. 8-3-10

NOTE

- Use standard wire only
- Wire type : More than H05 RN-F (1,3 mm² or more)

- Insert the connecting cable fully into the terminal block and secure it by screw tightly.
- Tightening torque : 1,2 N•m (12 kgf•cm)
- Secure the connecting cable with the cord clamp.
- Fix the wiring cover, rear plate bushing and front panel on the indoor unit.

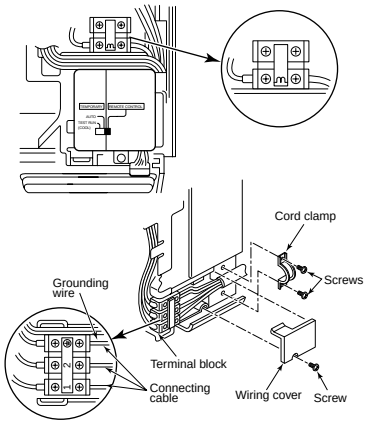


Fig. 8-3-11

8-3-5. Piping and Drain Hose Installation

Left-hand connection with piping

- After scribing slits of the rear panel by a knife or a marking-off pin, cut them by a pair of nippers or the like.

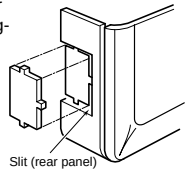


Fig. 8-3-12

Bend the connecting pipe so that it is laid within 52 mm above the wall surface. If the connecting pipe is laid exceeding 52 mm above the wall surface, the indoor unit may unstably be set on the wall.

When bending the connecting pipe, make sure to use spring bender so as not to crush the pipe.

Bend the connecting pipe within a radius of 40 mm.

NOTE

If the pipe is bent incorrectly, the indoor unit would be unstably set on the wall and the air conditioner might be raised.

1. When the piping runs to the left, remove the left side body bushing of the rear panel. You may need the body bushing when you relocate the unit, so be sure to make customer keep it in a safe place.
2. After passing the connecting pipe through the pipe hole, connect the connecting pipe to the auxiliary pipes and wrap facing tape around them.

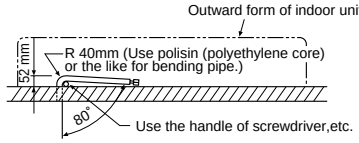

Outward form of indoor unit
52 mm
R 40mm (Use polisin (polyethylene core) or the like for bending pipe.)
80°
Use the handle of screwdriver,etc.

Fig. 8-3-13

Underside connection with piping

1. Cut out the knock-out piece from the right below of the rear plate with a knife, etc. Smooth the cut edges.

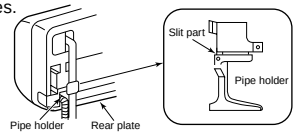


Fig. 8-3-14

CAUTION

- Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. In case of leftward piping and rear-leftward piping, bind the auxiliary pipes (two) only with facing tape.

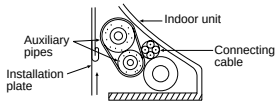


Fig. 8-3-15

- Carefully arrange pipes so that any pipe does not stick out of the rear plate of the indoor unit.
- Carefully connect the auxiliary pipes and connecting pipes to each other and cut off the insulating tape wound on the connecting pipe to avoid double-taping at the joint, moreover, seal the joint with the vinyl tape, etc.
- Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.)
- When bending a pipe, carefully do it not to crush it.

8-3-6. Indoor Unit Fixing

1. Pass the pipe through the hole in the wall, and hook the indoor unit on the installation plate at the upper hooks.
2. Swing the indoor unit to right and left to confirm that it is firmly hooked up on the installation plate.
3. While pushing the indoor unit onto the wall by the lower part, hook it up on the installation plate by the lower part.
   Pull the indoor unit toward you by the lower part to confirm that it is firmly hooked up on the installation plate.

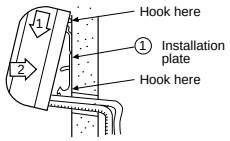


Fig. 8-3-16

This air conditioner has the structure designed to drain water collected from dew, which forms on the back of the indoor unit, to the drain pan.
Therefore, do not store the power cord and other parts at a height above the drain guide.

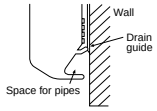


Fig. 8-3-17

8-3-7. Drainage

1. Run the drain hose sloping downwards.

NOTE

- Hole should be made at a slight downward slant to the outdoor side.

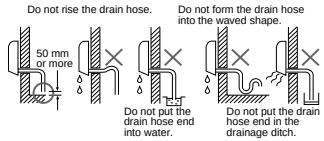

Do not rise the drain hose.
Do not form the drain hose into the waved shape.
50 mm or more
Do not put the drain hose end into water.
Do not put the drain hose end in the drainage ditch.

Fig. 8-3-18

2. Put water in the drain pan and make sure that the water is drained out of doors.
3. When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

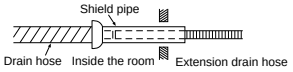


Fig. 8-3-19

CAUTION

Arrange the drain pipe for proper drainage from the unit. Improper drainage can result in dew-dropping.

How to install the front panel on the indoor unit

Install the front panel through the opposite order of "How to remove the front panel".

When the panel is removed and mounted again, take the following action : After fastening the 6 screws, be sure to hook the inside clicks ①, ②, and ③ of the front panel shown in the diagram, right gap is between the front panel and the rear plate.

- If cooling (dry) operation is made without pushing the air outlet, dew can be deposited on the front panel surface.
  In addition, a gap between the front panel and the body will become wider, spoiling the appearance.

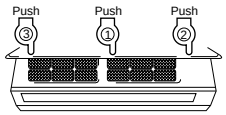


Fig. 8-3-20

8-3-8. Gas Leak Test

- Check the flare nut connections, valve stem cap connections and service cap connections for gas leak with a leak detector or soap water.

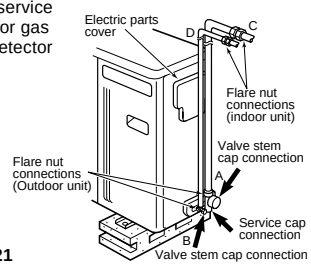


Fig. 8-3-21

8-3-9. Check and Test Operation

- ☐ 1. Check the unit is firmly hooked up on the installation plate.
- ☐ 2. Check the connecting pipes tightened securely.
  Confirm that there is no gas leakage.
- ☐ 3. Confirm that all connecting cables are secured and correct.
- ☐ 4. Check the pipe insulation.
- ☐ 5. Check the drainage.
- ☐ 6. Connection of the grounding wire.
- ☐ 7. To switch the TEST RUN (COOL) mode, turn the switch on.

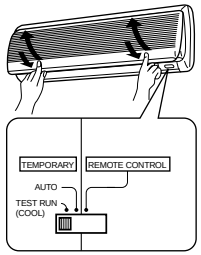


Fig. 8-3-22

Make sure to return the TEMPORARY switch to REMOTE CONTROL.

Three-minutes protection feature

A protection feature prevents the air conditioner from being active for about 3 minuets when it is restarted immediately after operation.

- ☐ 8. Operate the unit at cooling operation mode for fifteen minutes or more.
  Measure the temperature of the intake and discharge air. Ensure the difference between the intake temperature and the discharge one is more than 8°C.

  NOTE: Three-minutes protection feature

  A protection feature prevents the air conditioner from being activated for about 3 minutes when it is restarted immediately after operation.
- ☐ 9. Check the remote control operation when it is at fixed position.

When finished the check and test operation, make sure to return the TEMPORARY switch to REMOTE CONTROL.

- ☐ 10. Explain to the customer on the correct usage of air conditioner with simple layman's terms.

8-4. Outdoor Unit

8-4-1. Installation Place

- A place which provides the spaces around the outdoor unit as required above in the diagram.
- A dry sunny place. If the place is exposed to direct sunlight use an awning for protection.
- A place which can bear the weight of the outdoor unit and does not allow an increase in noise level and vibration.
- A place where the operation noise and discharged air do not disturb your neighbors.
- A place which is not exposed to a strong wind.
- A place free of a leakage of combustible gases.
- A place which does not block a passage.
- When the outdoor unit is to be installed in an elevated position, be sure to secure its feet.
- A place where the drain water does not raise any problem.
- An allowable length of the refrigerant piping is up to 15 m.
- An allowable heat level is up to 6 m.

CAUTION

1. Install the outdoor unit without anything blocking the air discharging.
2. When the outdoor unit is installed in a place exposed always to a strong wind like a coast or on a high story of a building, secure the normal fan operation using a duct or a wind shield.
3. Specially in windy area, install the unit to prevent the admission of wind.
4. Installation in the following places may result trouble. Do not install the unit such places.

- A place full of machine oil.
- A saline-place such as coast.
- A place full of sulfide gas.
- A place where high-frequency waves are likely to be generated as from audio equipment, welders, and medical equipment.

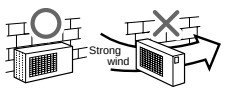


Fig. 8-4-1

8-4-2. Refrigerant Piping Connection

Flaring 1. Cut the pipe with a pipe cutter.

Fig. 8-4-2

2. Insert a flare nut into the pipe, and flare the pipe.

Outer dia. (mm)	A (mm)		Thickness (mm)
	Imperial	Rigid	
6,35	1,3	0,7	0,8
12,7	1,8	1,0 to 1,1	1,0

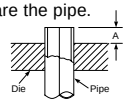


Fig. 8-4-3

Tightening Connection

Align the centers of the connecting pipes and tighten the flare nut as far as possible with your fingers Then tighten the nut with a spanner and torque wrench as shown in the figure.

CAUTION • Do not apply excess torque.
Otherwise, the nut may crack depending on the conditions

Outer dia. (mm)	Tightening torque	Additional tightening torque
6,35	16 (1,6 kgf•m)	18 (1,8 kgf•m)
12,7	49 (5,0 kgf•m)	54 (5,5 kgf•m)

(Unit : N•m)

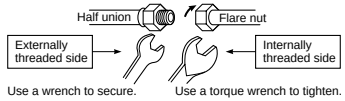


Fig. 8-4-4

8-4-3. Evacuating

AIR PURGE

Evacuate the air in the connecting pipes and in the indoor unit using vacuum pump. Do not use the refrigerant in the outdoor unit.

For details, see the manual of vacuum pump.

Use of vacuum pump

1. Connect the charge hose (A) from the manifold valve to the charge inlet of the gas side packed valve.
2. Connect the charge hose (B) to the port of vacuum pump.
3. Open fully the low pressure side handle of the manifold valve.
4. Operate the vacuum pump.
5. Close the low pressure side handle of manifold valve after evacuating and stop the vacuum pump.

Continue evacuating more than 15 minutes and check the pressure gage indicates –0,1 MPa (–76 cm Hg).

6. Open the stems of packed valves A and B1 all the way.
7. Securely tighten the stem cap to each of the packed valve stems.

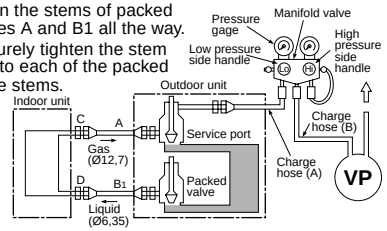


Fig. 8-4-5

CAUTION

- **KEEP IMPORTANT 4 POINTS FOR PIPING WORK**

(1) Take away dust and moisture (Inside of the connecting pipes.)
(2) Tight connection (between pipes and unit)
(3) Evacuate the air in the connecting pipes using VACUUM PUMP.
(4) Check gas leak (connected points)

Packed Valve Handling Precautions

- Open the valve stem all the way out; so not try to open it beyond the stopper.
- Securely tighten the valve stem cap torque is as follows;
  Gas pipes side (ø12,7 mm) : 49 N•m (5,0 kgf•m)
  Liquid pipe side (ø6,35 mm) : 16 N•m (1,6 kgf•m)

Hexagon wrench is required.

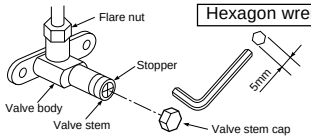


Fig. 8-4-6

8-4-4. Electrical Work

How to connect the power cord

For the air conditioner that has no power cord, connect a power cord to it as mentioned below.

- Remove the electric parts cover from the outdoor unit. (4 screws)
- After removing the electric parts cover, remove the cord clamp.
- Connect and secure the power supply cord.

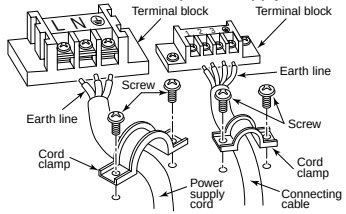


Fig. 8-4-7

Stripping length of power cord

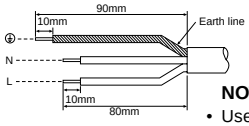


Fig. 8-4-8

NOTE

- Use standard wire only.
- Wire type : 3,5 mm² or more AWG-12.

WARNING

To plug the cable in the plug receptacle, take the following precaution.

THIS APPLIANCE MUST BE EARTHED.

IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLORED IN ACCORDANCE WITH THE FOLLOWING CODE :

L : Brown	-LIVE	L
N : Blue	-NEUTRAL	N
⏚ : Green and Yellow	-EARTH	⏚

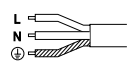


Fig. 8-4-9

As the colors of the flexible cord of this appliance may not correspond with the colored markings, to identify terminals in your plug, as follows :

Connect BROWN colored core to plug terminal marked letter "L".

Connect BLUE colored core to plug terminal marked letter "N".

Connect GREEN and YELLOW colored core to plug terminal marked Earth symbol " ⏚ ".

The installation of the cables has to be done in such a way that the basic insulated wires for the infrared sensor can not be touched.

Use the power supply cord/cables with thickness, type, and protective devices specified in the installation manual.

Prepare the interior power supply cord and cables wiring with current capacity sufficient for starting and usage of air conditioner.

Model	RAS-18YAH-E (RAS-18YKH-E)	RAS-18YAH-A (RAS-18YKH-A)
Power source	50 Hz ~, 220 – 240V	50 Hz ~, 240V
Maximum running current	16,8 A	
Plug socket & fuse rating	20 A	
Wiring	3,5 mm² (AWG-12) or more	

CAUTION

If incorrect/incomplete wiring is carried out, it will cause an electrical fire or smoke.

Prepare the power source for exclusive use with the air conditioner.

This product can be connected to the mains.

Connection to fixed wiring :

A switch or circuit breaker which disconnects all poles and has a contect separation of at least 3 mm must be incorporated in the fixed wiring.

An approved short circuit breaker or switches must be used.

8-4-5. Wiring Connection

1. Remove the electric parts cover from the outdoor unit. (4 screws)
2. Connect the connecting cable to the terminal as identified with their respective matched numbers on the terminal block of indoor and outdoor unit. (1,3 mm² AWG-16 or more)
3. When connecting the connecting cable to the outdoor unit terminal, make a loop as shown installation diagram, to prevent water coming in the outdoor unit.
4. Insulate the unused cords (conductors) with strip the sheath of connecting cable to prevent the shortage or electric leakage.

   Process them so that they do not touch any electrical or metal parts.

Stripping length of connecting cable

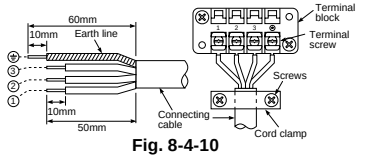


Fig. 8-4-10

CAUTION

1. Wrong wiring connection may cause some electrical parts burn out.
2. Be sure to use the cord clamps and the electric parts cover to the specified positions with attached to the product.

   Mount the electrical parts cover for cables of connecting section firmly with the screws.
3. Do not damage or scratch the conductive core and inner insulator of power supply and inter connecting cables when peeling them.
4. Be sure to comply with local cords on running the wire from indoor unit to outdoor unit (size of wire and wiring method etc.) Wire type : More than H05 RN-F
5. Use the power supply cord and inter-connecting cable with specified thickness, specified type, and protective devices specified.
6. No wire should touch refrigerant piping, compressor of any moving parts.

9. TROUBLESHOOTING CHART

Troubleshooting Procedures :

- Following details of “What to be pre-checked first”, make sure of the basic items.
- When there is no trouble corresponding to above, check in detail the faulty parts following “How to judge faulty parts by symptoms” later.

9-1. What to be Prechecked First

9-1-1. Power Supply Voltage

The line voltage must be AC 220–240V (RAS-18YKH-E, RAS-18YAH-E), 240V (RAS-18YKH-A, RAS-18YAH-A). If the line voltage is not within this range, this air conditioner may not work normally.

9-1-2. Incorrect Cable Connection between Indoor and Outdoor Units

The indoor unit is connected to the outdoor unit with 4 cables. Make certain that the indoor and outdoor units have been connected properly, with terminals assigned the same numbers wired to each other.
If the connectors are not connected as specified, the outdoor unit will not operate normally, or OPERATION lamp and TIMER lamp will flash (5Hz).

9-1-3. Misleading but Good Operations (Program Controlled Operation)

The microcomputer performs the operations listed in Table 9-1-1 to control the air conditioner. If a claim is made on the operation, check whether it corresponds to the contents in the Table 9-1-1.
If it does, it is an indispensable operation for the control and maintenance of the air conditioner: it is not a failure of the unit.

Table 9-1-1

No.	Operation of air-conditioner	Description
1	When the breaker is turned on, the OPERATION lamp on the setting indication part flashes.	The OPERATION lamp flashes, indicating that power is turned on. If this happens, push the START/STOP button once to cause the lamp to stop flashing. A power outage also causes the lamp to flash.
2	Fan speed remains unchanged in the dry mode.	Fan speed is automatically controlled in the dry mode.
3	Room temperature is in the range under which the compressor is turned off, but the compressor will not stop.	The compressor will not stop while the compressor on hold timer (3-minutes timer) is actuated.
4	The compressor will not switch on or off even when the thermo control is operated in the dry operation.	In the dry mode, the compressor goes on and off at regular intervals, independent of the thermo control.
5	The PRE-DEF. lamp comes on when the heating operation is started.	The PRE-DEF. lamp comes on during defrost operation and when the indoor heat exchanger temperature is low when the heating operation is started. At this time, the indoor fan is stopped to prevent cold air from drifting into the room.
6	The outdoor fan stops once in the while during the heating operation.	• When the indoor heat exchanger temperature is high, the outdoor fan may be stopped by the high-temperature limit control operation.
7	Compressor does not work though room temperature is in the range of turning the compressor on.	Compressor does not work while the compressor restart delay (3-min.) timer is active. The same is true after power is turned on, as the time is still active.
8	During automatic operation, the operation mode changes.	After selection of the cooling and heating operation, the operation mode is selected again when the compressor off mode continues for 15 min. according to the room temperature.
9	During automatic operation mode, the fan only operation continues.	When the room temperature is within setting temperature ± 1°C the fan only mode is selected.

9-2. Primary Judgment of Trouble Sources

9-2-1. Role of Indoor Unit Control

The indoor unit controller receives the operation commands from the remote control and assumes the following functions.

- Measurement of the draft air temperature of the indoor heat exchanger by using the thermo sensor (TA).
- Louver motor control
- Control of the indoor fan motor operation
- Control of the LED display
- Sends the operation signal to the outdoor micro-computer.

9-2-2. Display of Abnormalities and Judgement of the Abnormal Spots

The indoor unit of this machine observes the operation condition of the air conditioner and displays the contents of the self-diagnosis as block displays on the display panel of the indoor unit.

Table 9-2-1

	Block display	Block display
A	OPERATION display flashing (1 Hz)	Power failure (when power is ON)
B	OPERATION display flashing (5 Hz)	Thermo sensor (TA) short/break
C	OPERATION display flashing (5 Hz)	Heat exchanger sensor (TC) short/break
D	OPERATION display flashing (5 Hz)	Indoor fan lock, abnormality of indoor fan
E	OPERATION display flashing (5 Hz)	Indoor P.C. board failure
F	OPERATION and TIMER display flashing (5 Hz)	Wrong wiring of connecting cable
G	OPERATION, TIMER and PRE-DEF. display flashing (5 Hz)	• Gas shortage, other refrigerant cycle trouble • Heat exchanger sensor open/break/short • Overload relay or thermostat for compressor trouble
H	OPERATION, TIMER and PRE-DEF. display flashing (5 Hz)	Cycle abnormal

(1) Judgement from defective operation or abnormal operation

Table 9-2-2

Symptom	Check		Primary judgement
No reaction on remote control operation	Turn off the power once, turn it on again and try to operate the remote control again.	Remote control is not possible.	The indoor part (including the remote control) is defective.
		Remote control is possible.	OK.
The outdoor fan does not rotate	The compressor operates.		The outdoor part is defective. (outdoor fan motor)
	The compressor does not operate.		The inside part is defective.

(2) Self-diagnosis with remote control

With the indoor unit control, self-diagnosis of protective circuit action can be done by turning the remote control operation into service mode, operating the remote control, observing the remote control indicators and checking whether TIMER lamp flashes (5 Hz).

Note :

- **To perform this self-diagnosis, the remote control with the service code of 43069666 is required.**

<How to select remote control operation mode>

1) Selecting service mode

Push the switch button provided on rear bottom of the wireless remote control with a tip of pencil for more than 3 seconds.

Make sure the setting temperature "00" is displayed on the display and other display is turned off.

2) Selecting ordinary mode

Push the all clear button (ACL) on the rear bottom of the wireless remote control with a tip of pencil for more than 3 seconds. Make sure the operation mode display, wind volume display, clock display and setting temperature display are turned on and " : " of the clock display is flashing.

<Cautions when doing service>

1) After completion of servicing, always push the all clear (ACL) button to return the operation mode to the normal mode.
2) After completion of servicing by the check code, turn off the power once and then turn on the power to reset memorized contents of the microcomputer to the initial status.

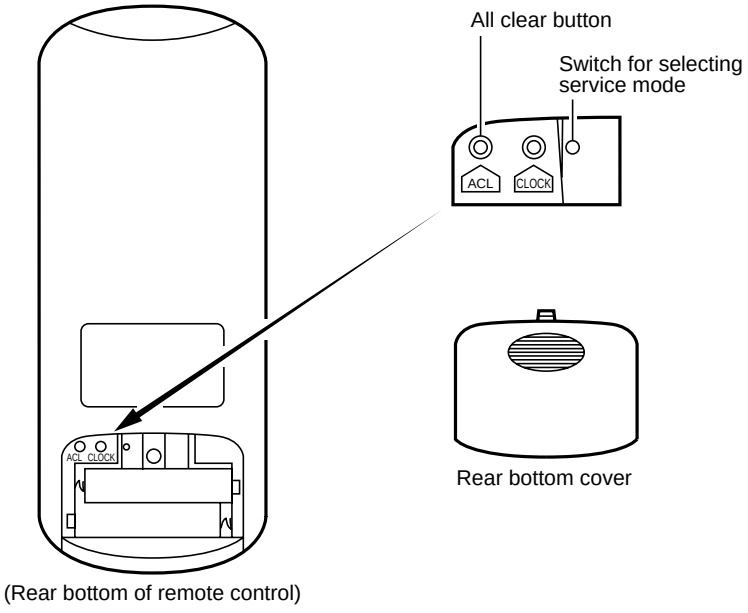


Fig. 9-2-1

<Self-diagnosis by check codes>

1) The self-diagnosis by the check codes is conducted under the block displays of item B-H in Table 9-2-1.
2) Remote control key operation under the service mode is conducted by ON/OFF or TEMP. The remote control display by each key operation is varied as shown below. Two digit number is displayed in a hexadecimal number.
3) The self-diagnosis by the check codes is conducted with procedures shown below.
   a) Enter the service mode and make sure the off timer display of the remote control shows "00".
   b) Operate the "ON/OFF" key and make sure the timer lamp on the display section is flashing (5 Hz).
   c) At the same time, also make sure the operation lamp is also flashing. This shows that the protection circuit on the indoor P.C. board is working.
   d) Operate the TEMP. △ key and make sure the remote control display shows "01" and flashing of the operation lamp. If the operation lamp is flashing, it shows the protection circuits for connecting cable is working or thermal fuse is blown.
   e) In the same way, operate the TEMP. △ key so that the display is increased one by one to continue checks by the self-diagnosis as shown in the next table. From "00" up to "03" check operations of protection circuits for each block, and "04" to "1F" check operations of the typical protection circuits.

Table 9-2-3

Operating key	Indication after operation
ON/OFF	00
TEMP. △ (Up)	1 is added to data before operation. (Example) "02"→"03"
TEMP. ▽ (Down)	1 is subtracted from data before operation. (Example) "02"→"01"
"AUTO" LOUVER	10 is subtracted from data before operation. (Example) "02"→"12"
"SET" LOUVER	Data before operation is directly transferred. (Example) "02"→"02"

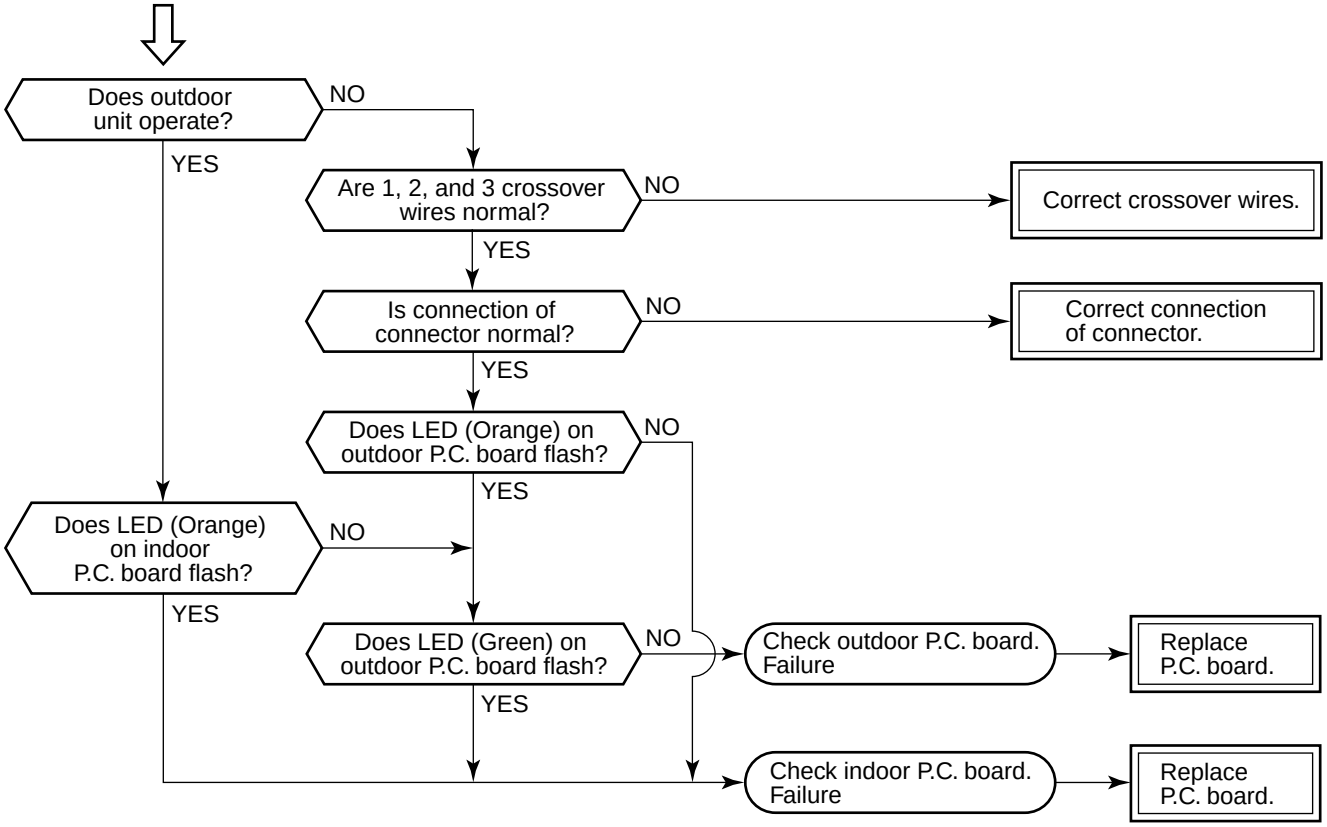
Table 9-2-4

Block level		Diagnosis function				Judgment and action
Check code	Block	Check code	Symptom	Air Conditioner status	Condition	
00	Indoor P.C. board	0C	Indoor temp. (TA) sensor is out of place. Disconnection or short-circuit	Operation continues.	Displayed when error is detected.	1. Check the indoor temp. sensor (TA). 2. Check the indoor P.C. board.
		0d	Indoor temp. (TC) sensor is out of place. Disconnection or short-circuit	Operation continues.	Displayed when error is detected.	1. Check the indoor temp. sensor (TC). 2. Check the indoor P.C. board.
		11	Trouble on indoor fan Abnormal revolution speed of fan	All off	Displayed when error is detected.	1. Check the connector circuit for revolution speed input (CN13). 2. Check the indoor fan. 3. Check the indoor P.C. board.
		12	Indoor unit or other part is defective. EEPROM access error	Operation continues.	Displayed when error is detected.	1. Check the indoor P.C. board. (EEPROM and peripheral circuits)
		18	Outdoor temp. sensor is out of place. Disconnection or short-circuit	All off	Displayed when error is detected.	1. Check the outdoor temp. sensor (TE). 2. Check the P.C. board.
		19	Outdoor temp. sensor is out of place. Disconnection or short-circuit	All off	Displayed when error is detected.	1. Check the outdoor temp. sensor (TD). 2. Check the P.C. board.
		1E	Discharge temp. error Detection of discharge temp. over the set value	All off	Displayed when error is detected.	1. Check the refrigerating cycle (Gas leak). 2. Check the pipe sensor (TD).
		21	High-pressure switch operation IOL operation	All off	Displayed when error is detected.	1. Check the high-pressure switch. 2. Check the circuits of high-pressure switch line. • Disconnection and contact failure of CN04 connector • Check the P.C. board. 3. Overload operation of the refrigerating cycle
01	Cable connection	04	Serial signal is not sent from the outdoor unit to the indoor unit. • Miswiring of crossover wire • Serial send circuit of the outdoor P.C. board is defective. • Serial receive circuit of the indoor P.C. board is defective.	Operation continues.	Displayed when error is detected.	1. In case that the outdoor unit does not operate at all, • Check crossover wire./Correct miswiring. • Check the outdoor P.C. board. 2. In case that the outdoor unit operates normally, While the outdoor send Serial LED (Green) on the indoor P.C. board flashes, If the receive Serial LED (Orange) Flashes : Check the indoor P.C. board. Does not flash : Check the outdoor P.C. board.
03	Refrigerant system	08	Trouble on the four-way valve system • After cooling operation has started, the indoor heat exchanger temp. rises. • After heating operation has started, the indoor heat exchanger temp. lowers.	Operation continues.	Displayed when error is detected.	1. Check the four-way valve. 2. Check the indoor heat exchanger sensor (TC). 3. Check the indoor P.C. board.
		09	Trouble on other cycle line • After cooling/heating operation has started, the indoor heat exchanger temp. (TC) does not vary.	Operation continues.	Displayed when error is detected.	1. Inner overload relay operation of compressor case thermostat (Electromagnetic contact OFF-STOP) 2. Indoor heat exchanger sensor sensing part out of place 3. Check the indoor heat exchanger sensor (TC). 4. Check the indoor P.C. board.
			• When the compressor stop command is sent by freeze-preventing control.	Operation continues. Compressor stops. Indoor fan LOW	Displayed when error is detected.	1. Check the charged amount of refrigerant gas. • Gas shortage → Gas refilling, gas leak check 2. Check the indoor fan. (Lock)
		1d	Compressor break down.	All off	Indicated when detected abnormal	1. Check compressor. 2. If it is OK, check P.C. board.
Contents detected by the check codes "04" to "1d" are stored in memory of the microcomputer even if the power supply is turned off. Therefore, contents of operations in the past are all displayed.						

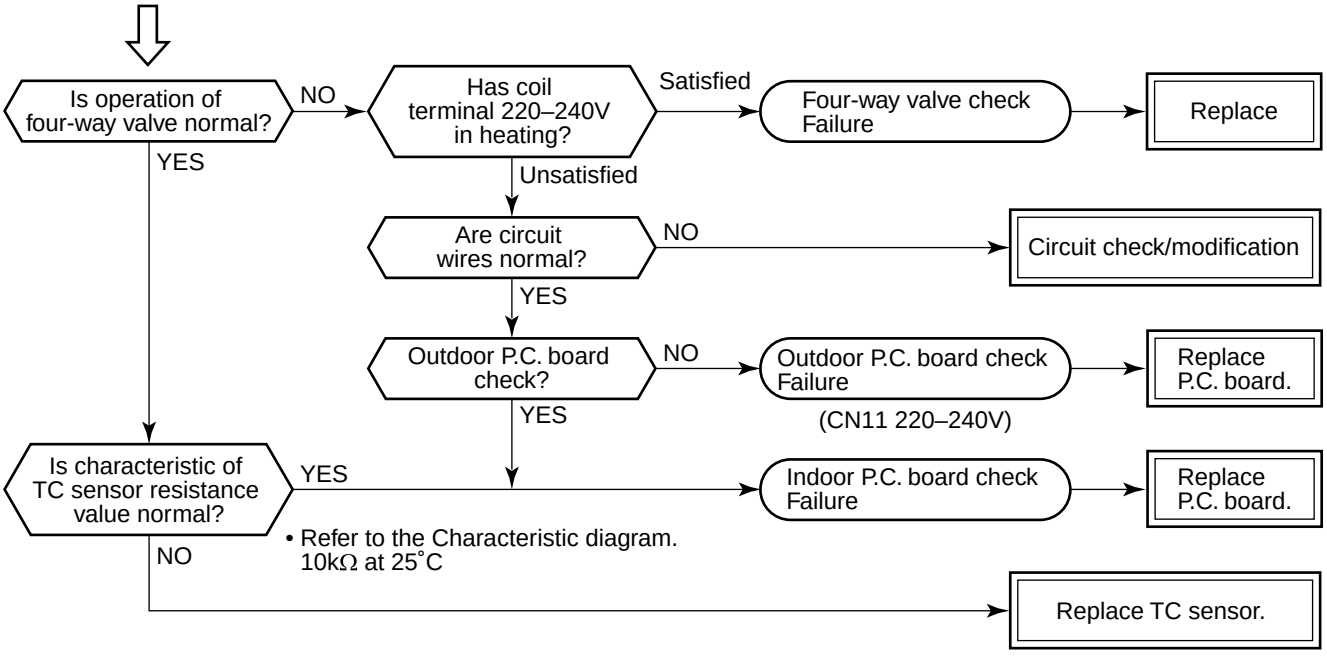
Details of Table 9-2-2

Judgment of Trouble by Every Symptom

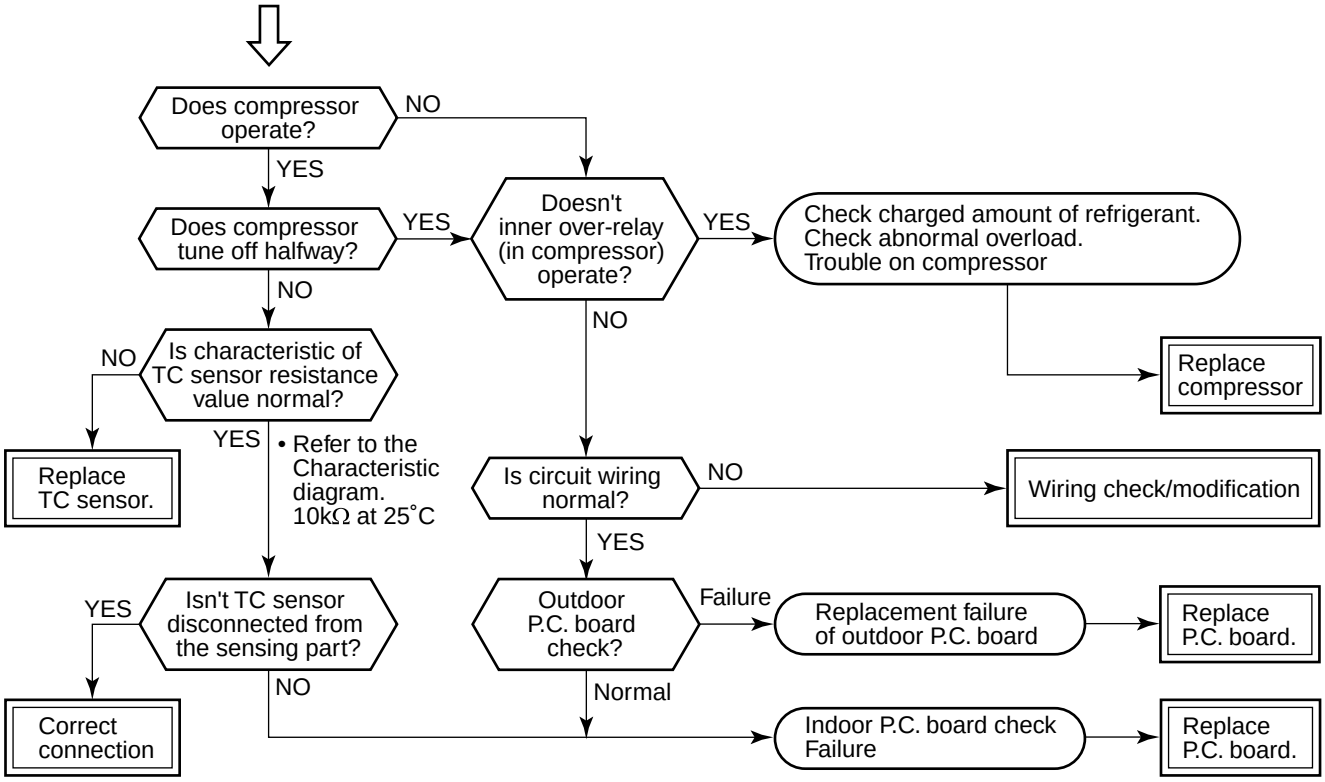
[04 Serial signal error]



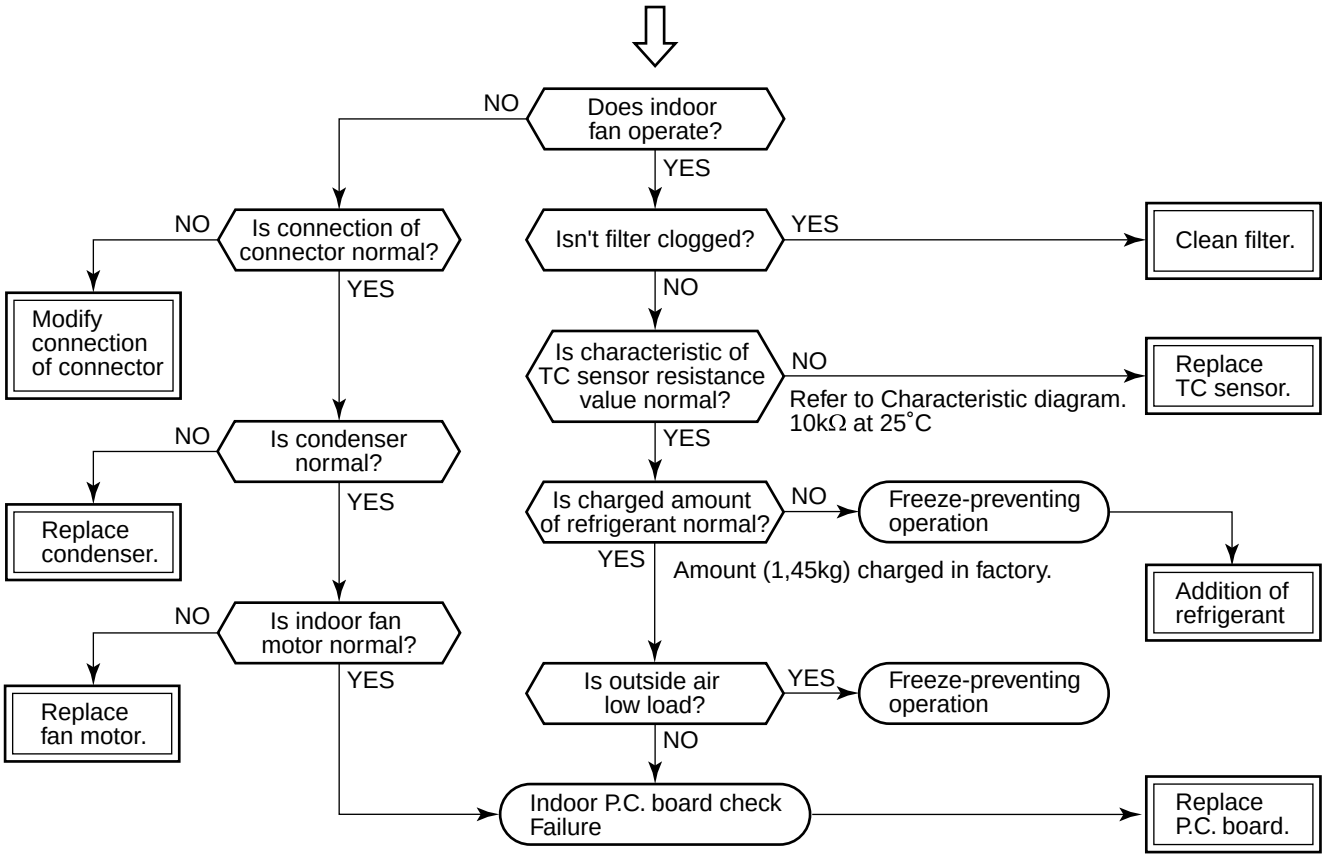
[08 Four-way valve error]



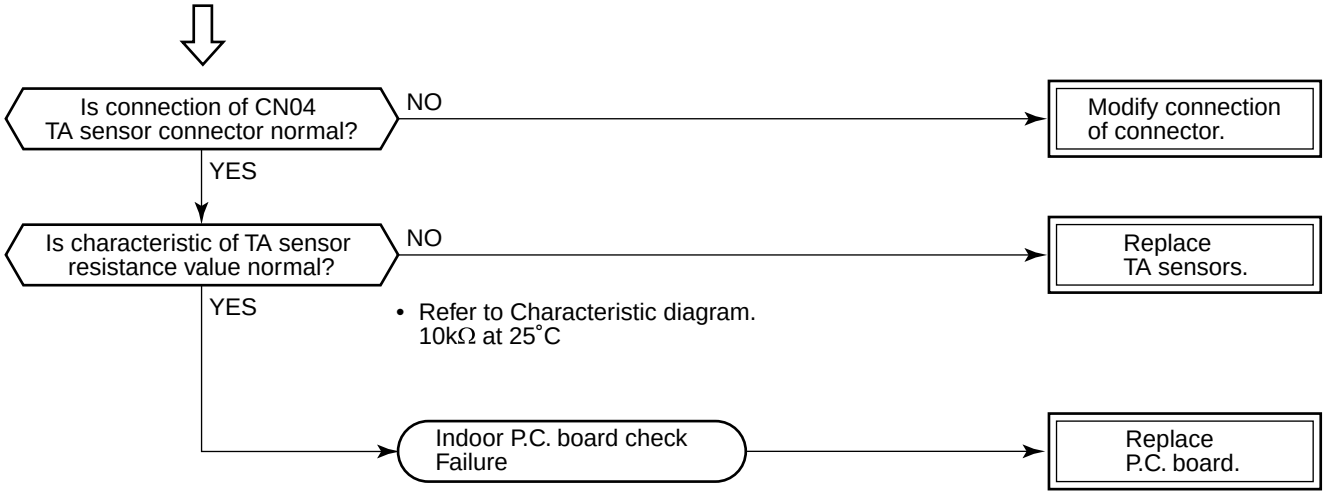
[09 Other cycle error] (1)



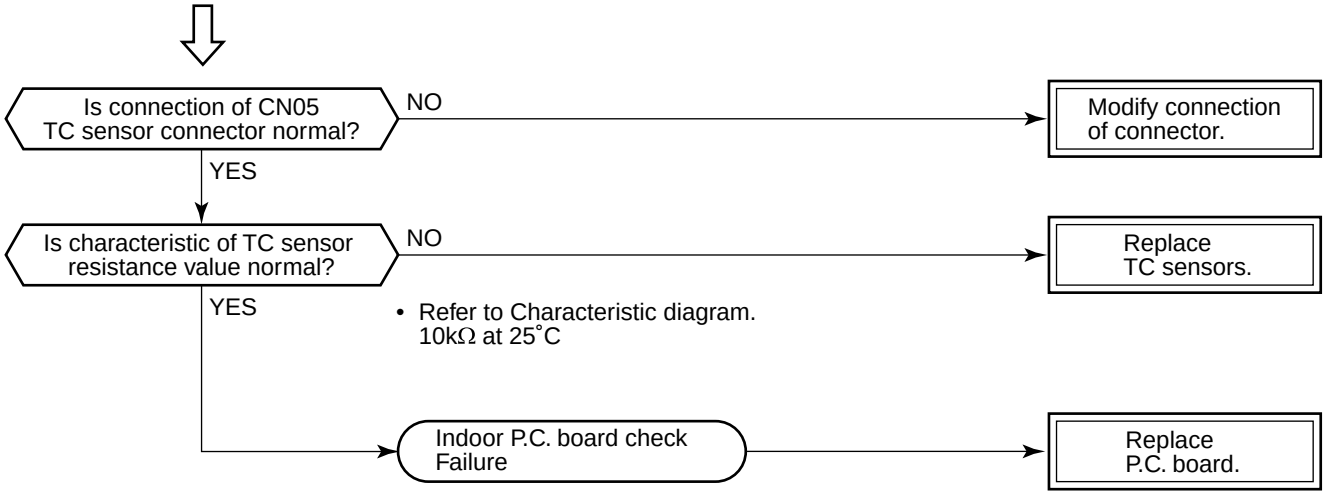
[09 Other cycle error] (2)



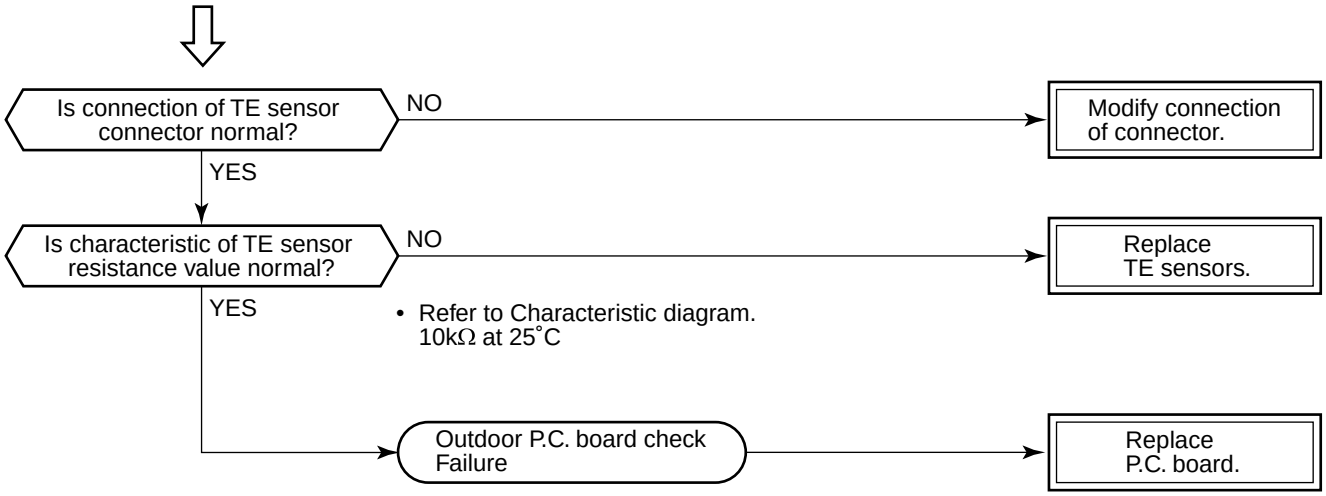
[0C Indoor TA sensor error]



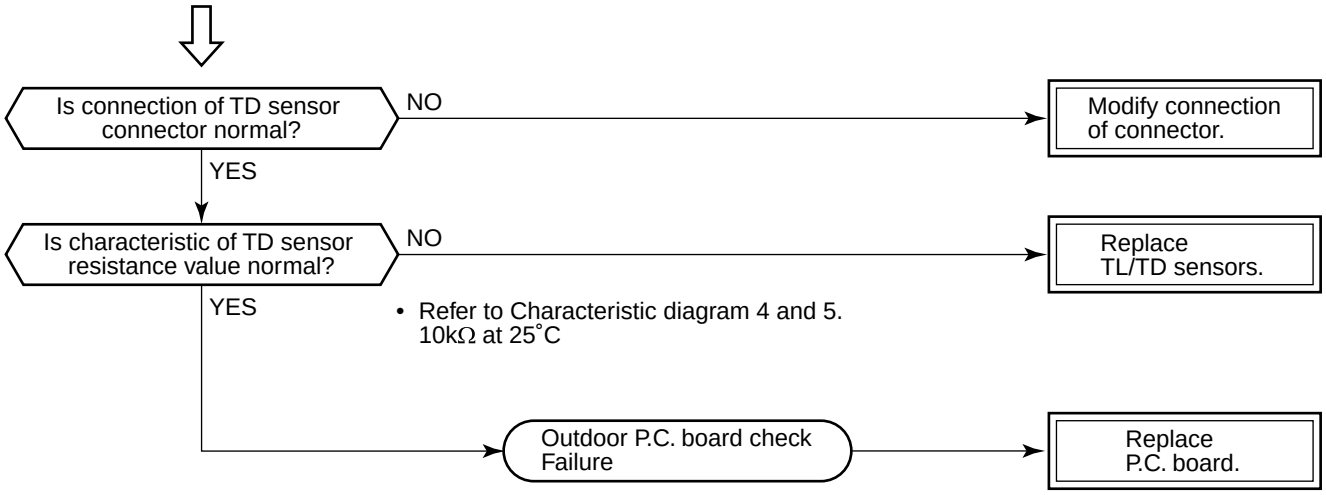
[0d Indoor TC sensor error]



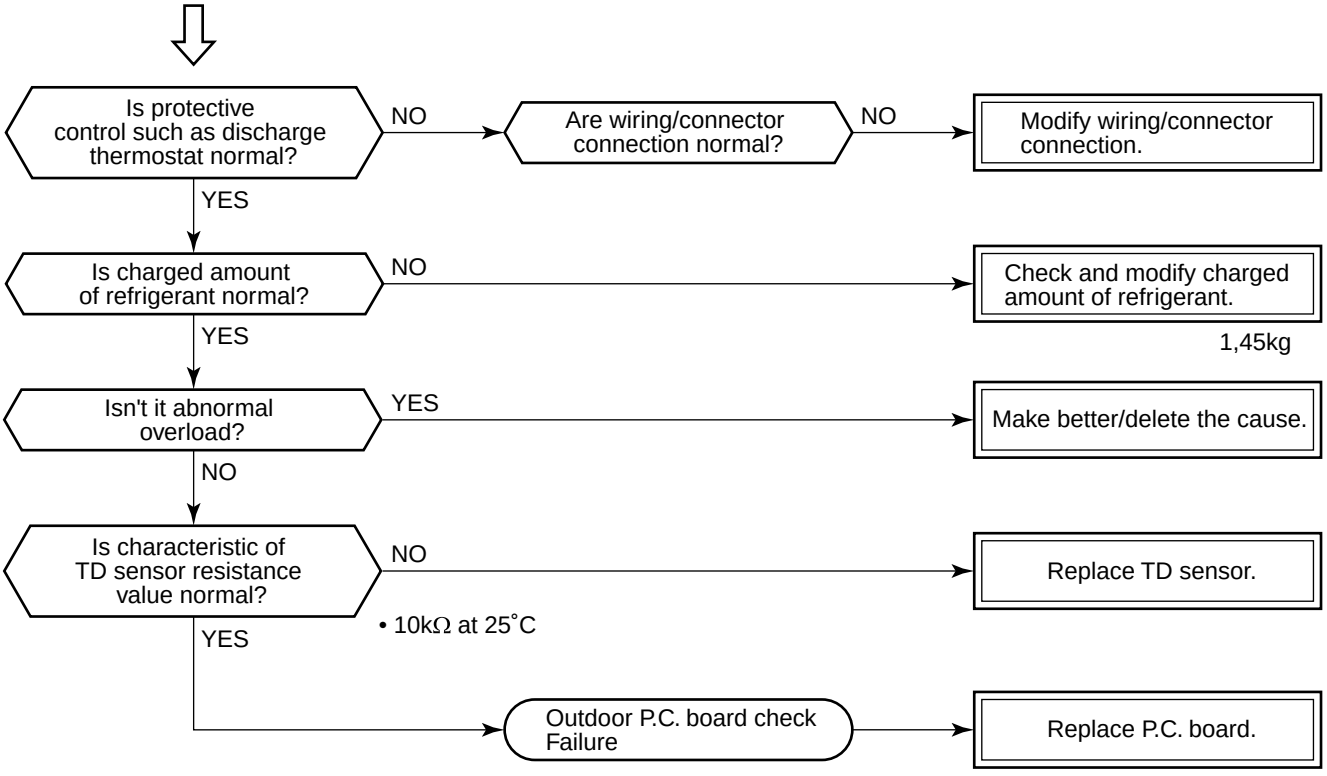
[18 Outdoor TE sensor error]



[19 Outdoor TD sensor error]


Is connection of TD sensor connector normal?
NO
Modify connection of connector.
YES
Is characteristic of TD sensor resistance value normal?
NO
Replace TL/TD sensors.
YES
• Refer to Characteristic diagram 4 and 5. 10kΩ at 25˚C
Outdoor P.C. board check Failure
Replace P.C. board.

[1E Discharge temp. error]



9-3. Troubleshooting Flowcharts

9-3-1. Power cannot be Turned on (No Operation at All)

< Preliminary checks >

(1) Is the supply voltage normal?

(2) Is the connection to the AC output OK?

(3) Are the connection of the primary side and the secondary side of the power transformer inserted into the P.C. board?

(4) Is the FUSE (F01) blown?

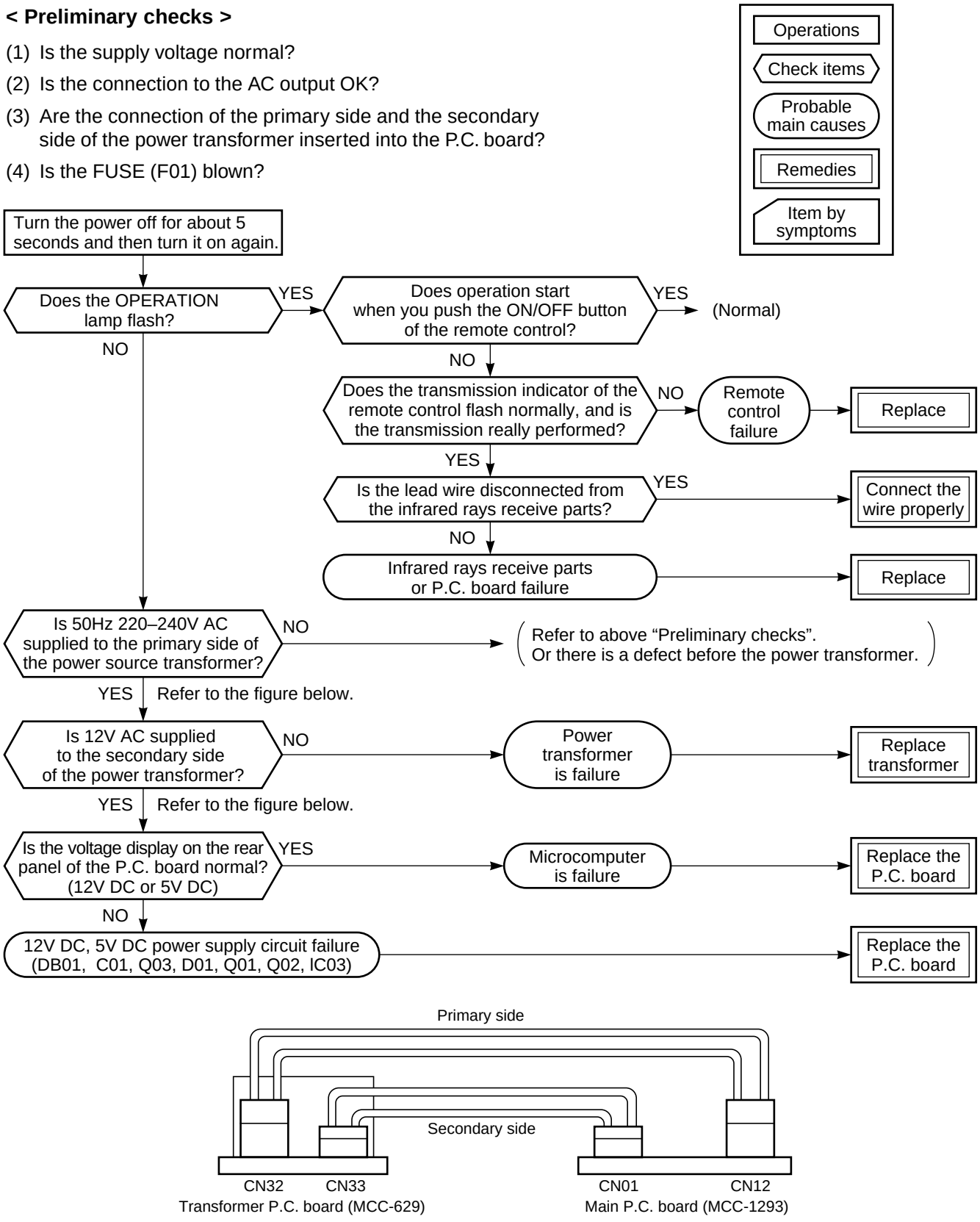

Operations
Check items
Probable main causes
Remedies
Item by symptoms
Turn the power off for about 5 seconds and then turn it on again.
Does the OPERATION lamp flash?
YES
Does operation start when you push the ON/OFF button of the remote control?
YES
(Normal)
NO
NO
Does the transmission indicator of the remote control flash normally, and is the transmission really performed?
NO
Remote control failure
Replace
YES
Is the lead wire disconnected from the infrared rays receive parts?
YES
Connect the wire properly
NO
Infrared rays receive parts or P.C. board failure
Replace
Is 50Hz 220–240V AC supplied to the primary side of the power source transformer?
NO
Refer to above “Preliminary checks”.
Or there is a defect before the power transformer.
YES
Refer to the figure below.
Is 12V AC supplied to the secondary side of the power transformer?
NO
Power transformer is failure
Replace transformer
YES
Refer to the figure below.
Is the voltage display on the rear panel of the P.C. board normal? (12V DC or 5V DC)
YES
Microcomputer is failure
Replace the P.C. board
NO
12V DC, 5V DC power supply circuit failure (DB01, C01, Q03, D01, Q01, Q02, IC03)
Replace the P.C. board

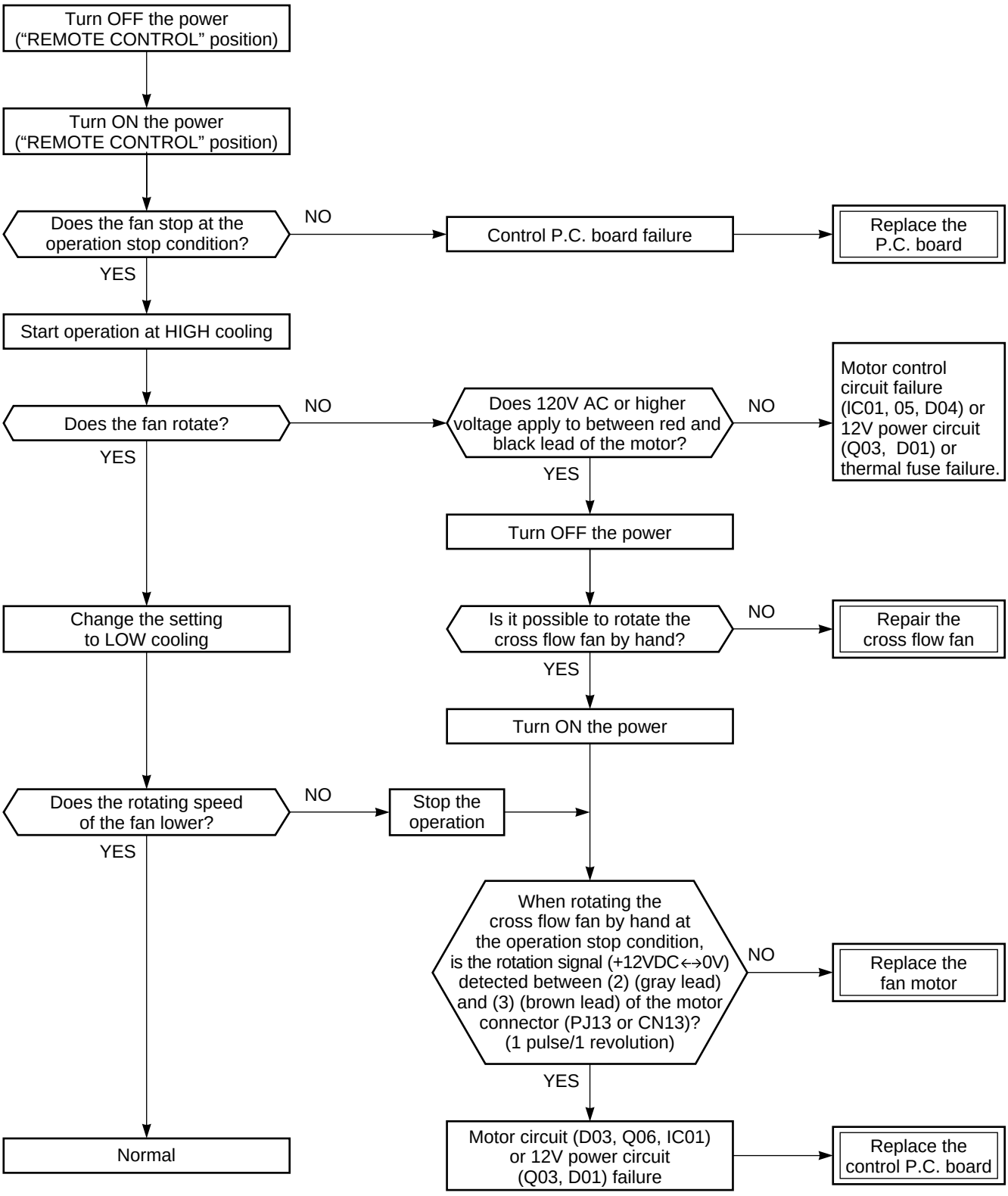
Fig. 9-3-1 Power transformer connection diagram

9-3-2. Only the Indoor Fan does not Operate

< Preliminary checks >

Does it neither work in COOL or FAN ONLY operation?

< Checking procedure >


Turn OFF the power ("REMOTE CONTROL" position)
Turn ON the power ("REMOTE CONTROL" position)
Does the fan stop at the operation stop condition?
NO
Control P.C. board failure
Replace the P.C. board
YES
Start operation at HIGH cooling
Does the fan rotate?
NO
Does 120V AC or higher voltage apply to between red and black lead of the motor?
NO
Motor control circuit failure (IC01, 05, D04) or 12V power circuit (Q03, D01) or thermal fuse failure.
YES
YES
Turn OFF the power
Change the setting to LOW cooling
Is it possible to rotate the cross flow fan by hand?
NO
Repair the cross flow fan
YES
Turn ON the power
Does the rotating speed of the fan lower?
NO
Stop the operation
YES
When rotating the cross flow fan by hand at the operation stop condition, is the rotation signal (+12VDC↔0V) detected between (2) (gray lead) and (3) (brown lead) of the motor connector (PJ13 or CN13)? (1 pulse/1 revolution)
NO
Replace the fan motor
YES
Normal
Motor circuit (D03, Q06, IC01) or 12V power circuit (Q03, D01) failure
Replace the control P.C. board

9-3-3. Wiring Failure (Interconnecting and Serial Signal Wire)

(1) Outdoor unit does not operate

1) Is the voltage between ② and ③ of the indoor terminal block varied?

Confirm that transmission from indoor to outdoor is correctly performed based upon the following diagram.

NOTE:

- Measurement should be performed 2 minutes and 30 seconds after starting of the operation.
- Be sure to prepare a diode for judgment.

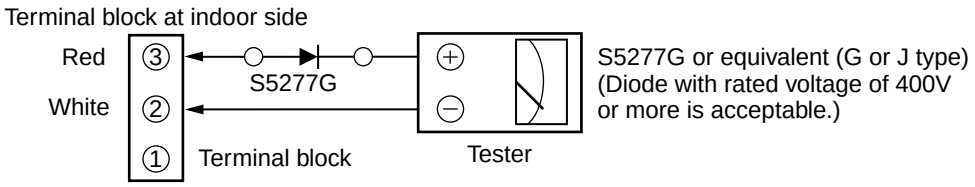


Fig. 9-3-2

Normal time : Voltage swings between DC15 and 60V.

Abnormal time : Voltage does not vary.

(2) Outdoor unit stops in a little while after operation started

<Check procedure> Select phenomena described below.

(1) The outdoor unit stops 10 to 20 minutes after operation started, and 10 minutes or more are required to restart the unit.

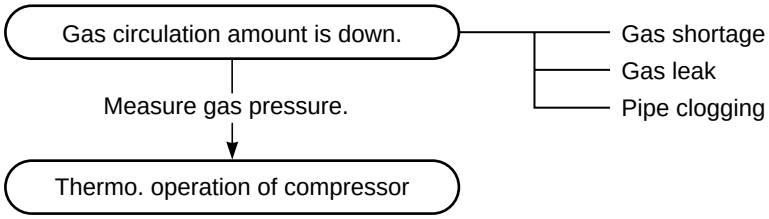


Fig. 9-3-3

(2) If the unit stops once, it does not operate until the power will be turned on again.

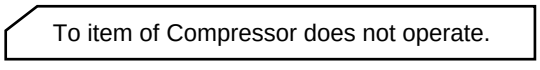


Fig. 9-3-4

(3) The outdoor unit stops 10 minutes to 1 hour after operation started, and an alarm is displayed. (Discharge temp. error check code 03, 1E Sensor temp. error check code 02, 1C)

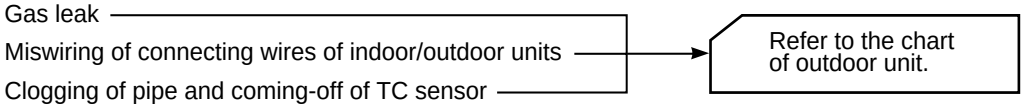

Gas leak
Miswiring of connecting wires of indoor/outdoor units
Clogging of pipe and coming-off of TC sensor
Refer to the chart
of outdoor unit.

Fig. 9-3-5

9-3-4. How to Check the P.C. Board

(1) Operating precautions

1) When removing the front panel or the P.C. board, be sure to disconnect the power plug from the AC outlet.
2) When removing the P.C. board, hold the edge of the P.C. board and do not apply force to the parts.
3) When connecting or disconnecting the connectors on the P.C. board, hold the whole housing. Do not pull at the lead wire.

(2) Inspection procedures

1) When a P.C. board is judged to be failure, check for disconnection, burning, or discoloration of the copper foil pattern or this P.C. board.
2) The P.C. board consists of the following 4 parts:

a. Main P.C. board part:

Power relay, indoor fan motor drive circuit and control circuit, C.P.U. and peripheral circuits, buzzer drive circuit and buzzer.

b. Infrared rays receive parts:

Infrared rays receiving circuit

c. Display:

LED

d. Switch P.C. board:

Wireless-control, TEMPORARY switch

e. Buzzer P.C. board:

Buzzer

f. Transformer P.C. board:

Transformer

Check the defects of the P.C. board following the list below. (Referring to Table 9-3-1)

(3) Checking procedure

Table 9-3-1

No.	Procedure	Check point (Symptom)	Trouble cause
1	Disconnect the power plug from the AC outlet and remove the P.C. board assembly from the elec tronic parts base. Remove the flat cable from the terminal plate.	Is the fuse blown?	1. Application of shock voltage 2. Short-circuit of the indoor fan motor
2	Turn the power ON. If the OPERATION lamp flash (0.5 sec. ON, 0.5 sec. OFF), steps 1–3 in the right column are not necessary.	Check power supply voltage. 1. Between CN12 1 and 3 (220–240V AC) 2. Between CN01 1 and 3 (12V AC) 3. Between TP6 (+5V) and GND (5V AC) 4. Between TP7 (+12V) and GND (12V DC)	1. Defective power cord, power switch, fuse or line filter, or wrong wiring 2. Defective power transformer 3. Defective power circuit or short-circuited load 4. Same as 3 5. Thermal fuse operation
3	Push the START/STOP button once to set in operation mode. (Do not set to the fan only or on-timer mode.)	Check power supply voltage. 1. Between terminals 2 and 3 2. Between terminals 1 and 2	1. Miswiring 2. PF terminal is failure.
4	Start operation by using the antirestart timer.	1. All LEDs of the OPERATION lamp, the TIMER lamp, PRE DEF. lamp, ECONO. lamp and AUTO lamp light up. 2. After 3 seconds, normal display does not appear.	} Display is failure or defect in the 9P housing assembly.

No.	Procedure	Check point (Symptom)	Trouble cause
5	Push the START/STOP button once to set in operation mode. 1. Setting the anti-restart timer 2. Cooling operation 3. Fan speed : AUTO 4. Set the temperature sufficiently lower than the room temperature. 5. Continuous operation	1. The compressor does not operate. 2. The OPERATION lamp flashes.	1. The temperature of the indoor heat exchange unit is extremely low. 2. Defective control P.C. board.
6	Connect the motor connector to “MOTOR” and turn the power ON. Start operation as follows: 1. Set the operation mode to “FAN ONLY". 2. Set the fan speed to “HIGH”. 3. Continuous operation	1. There is a voltage of 120V or more between the red and black motor connector leads. 2. The motor does not rotate. (But the key operation of the remote control is accepted.) 3. Motor rotates but vibrates hard.	1. Indoor fan motor is failure. 2. Contact of the motor connector is defective. 3. Main P.C. board is failure.

Table 9-3-2 Approximate value of the sensor (thermistor) resistance (TA, TC)

(•=. kW)

Sensor \ Temperature	0°C	10°C	20°C	25°C	30°C
Thermo. Sensor	35,8	20,7	12,6	10,0	7,92

9-3-5. How to Reduce the Operation Time of the Anti-restart Timer

- Drill 2 holes on the rear of the wireless remote control unit.

  Attach the diode (1S1555 or equivalent) to the rivet inside the unit.
- Push the START/STOP button to start operation with the diode attached.

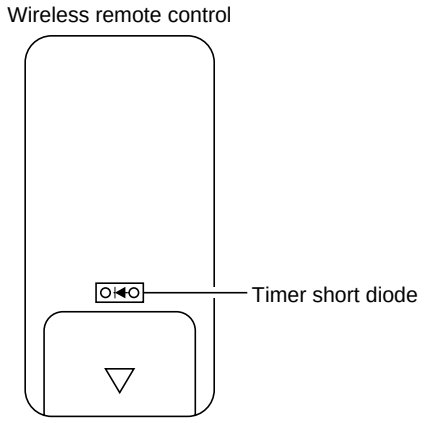
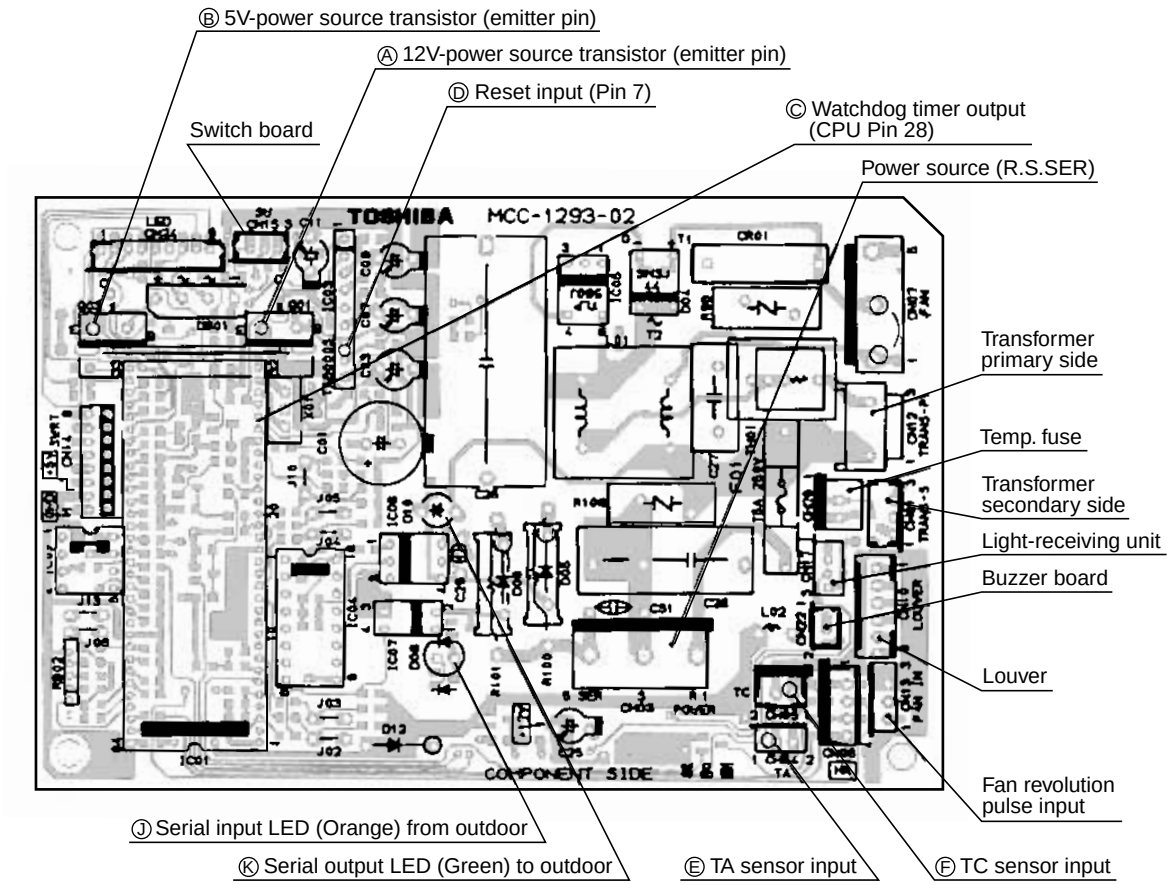


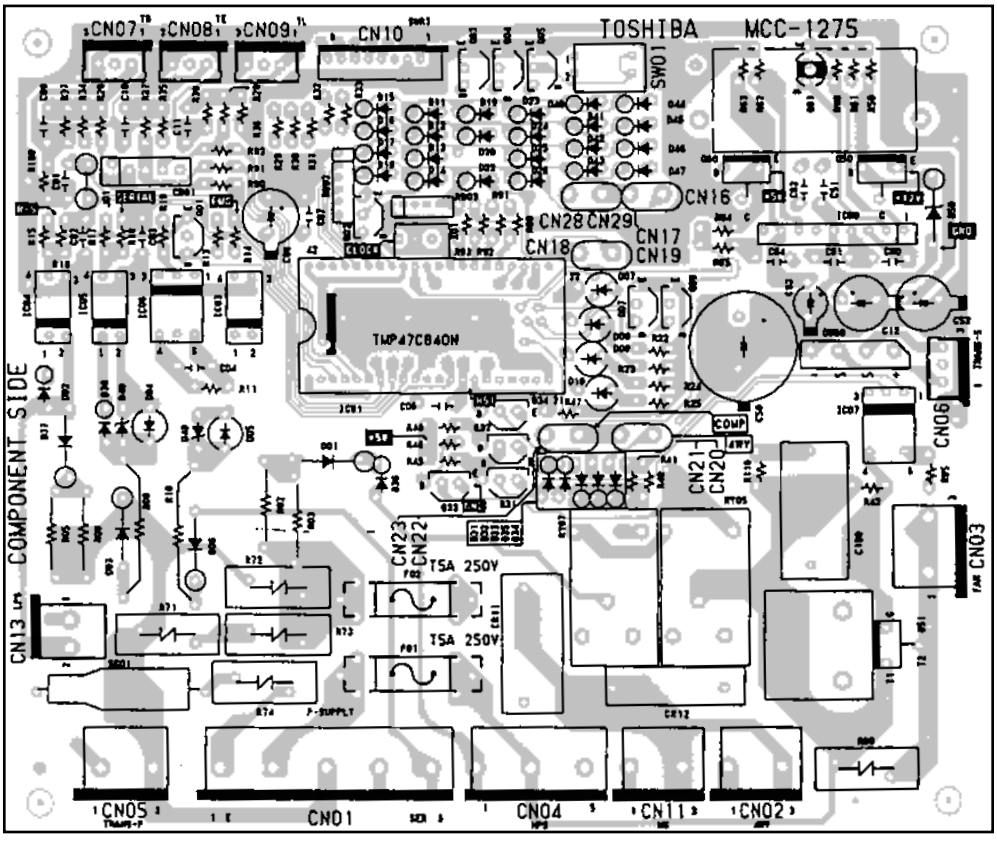
Fig. 9-3-6

Indoor Printed Circuit Board (P.C.B.)

MMC-1293



MMC-1275



9-3-6. Judgment by LED Display on Outdoor P.C. Board

When the check code is checked at the outdoor unit side, the following indications are available by LED and Dip switch (DSW01).

Table 9-3-3 LED display and check code

	Dip switch	LED			
		1 Red	2 Yellow	3 Yellow	4 Yellow
Table 1	ON 1 2	Timer short	20 Power line protective circuit		1E Pipe sensor (TD) temp. up protection 21 High-pressure switch line circuit
Table 2	ON 1 2	18 Heat exchanger sensor (TE) circuit, 19 Heat exchanger sensor (TL) and pipe sensor (TD) circuit		Protective operation frequency of sensor circuit error	

- When LED 1 to 4 is indicated with light in order, the phase detect protection circuit operates regardless of setting of Dip switch.

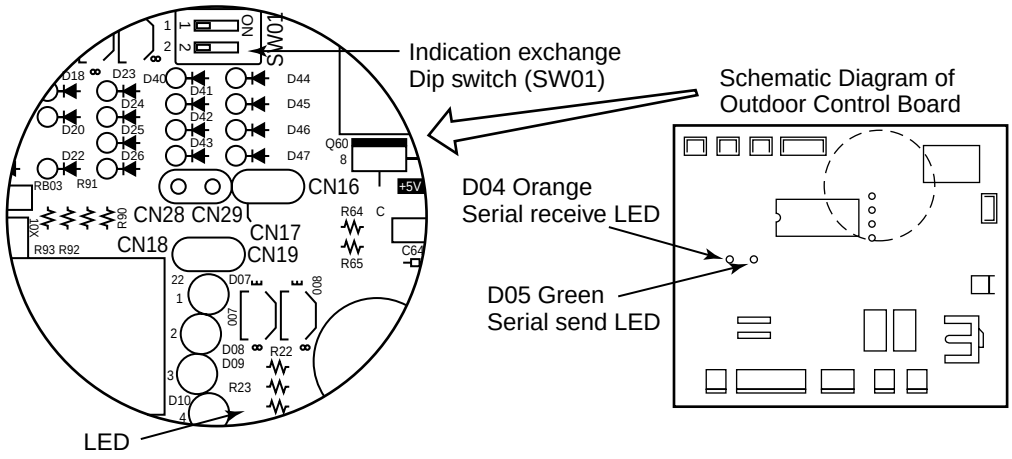


Fig. 9-3-7. Dip switch and LED position

< Table 1 >

Dip switch	LED 1	LED 2	LED 3	LED 4	Check contents	
ON 1 2	●	●	●	●	Normal operation	
	◔	●	●	●	Timer short operation	
	○	◔	○	○	20 Power line protective circuit	All off
	○	○	○	◔	1E Pipe sensor (TD) temp. up protection 21 High-pressure switch line circuit	
	○	○	○	○	Check 18 and 19. <See Table 2>	

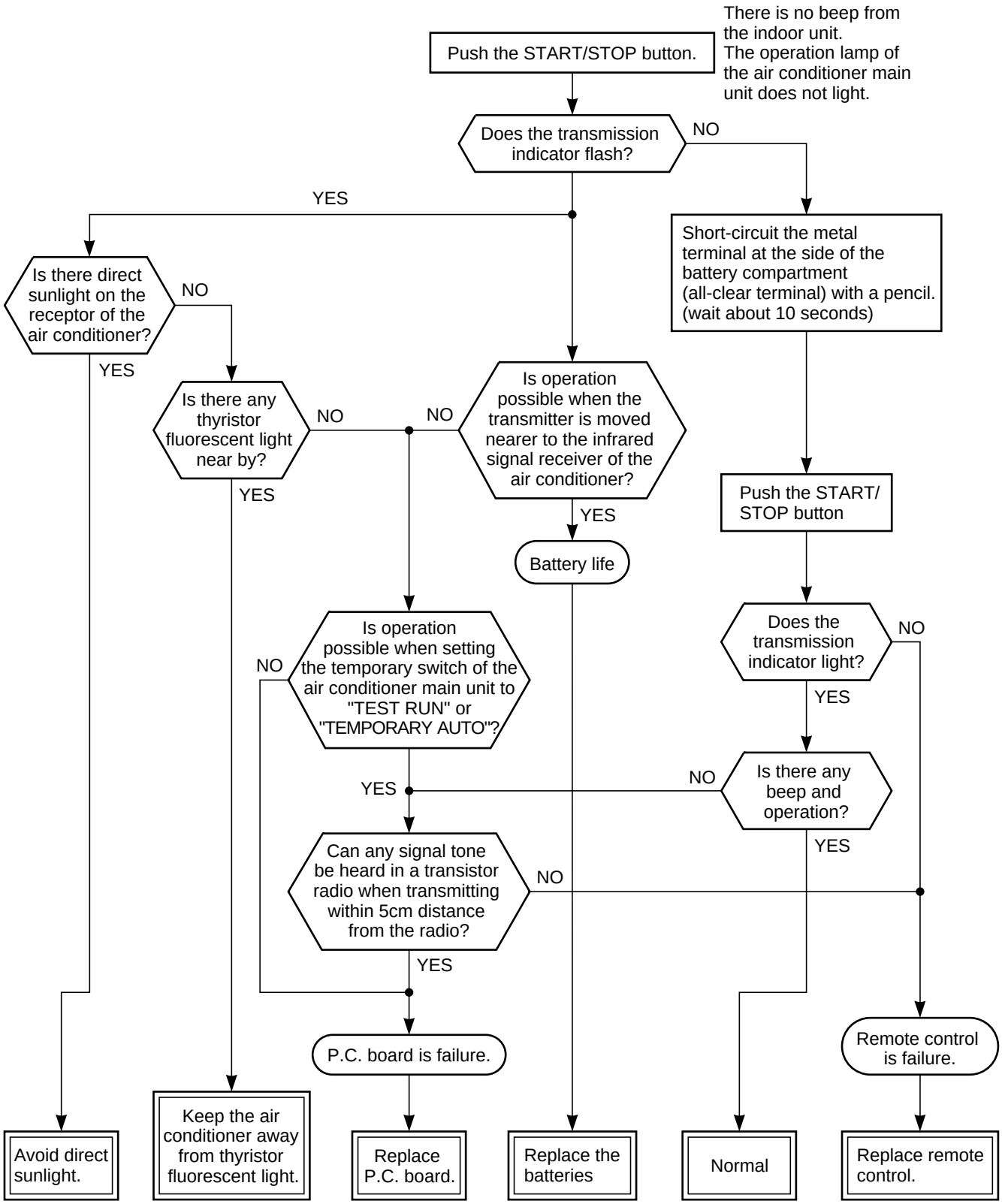
< Table 2 >

Dip switch	LED 1	LED 2	LED 3	LED 4	Check contents	
ON 1 2	●	●	●	●	Normal operation	
	●	●	●	○	Protective operation : Once	
	●	●	○	●	Protective operation : Twice	
	●	●	○	○	Protective operation : Three times	
	As follows.		◑	◑	Protective operation : Four times (Emergency stop)	All off
	◔	○	◑	◑	18 Heat exchanger (TE) circuit 19 Pipe sensor (TD) circuit	
	○	○	◑	◑	Check 1E and 21. <See Table 1>	

LED status

○ : Goes on ◔ : Fast flashing ◑ : Slow flashing ● : Goes off

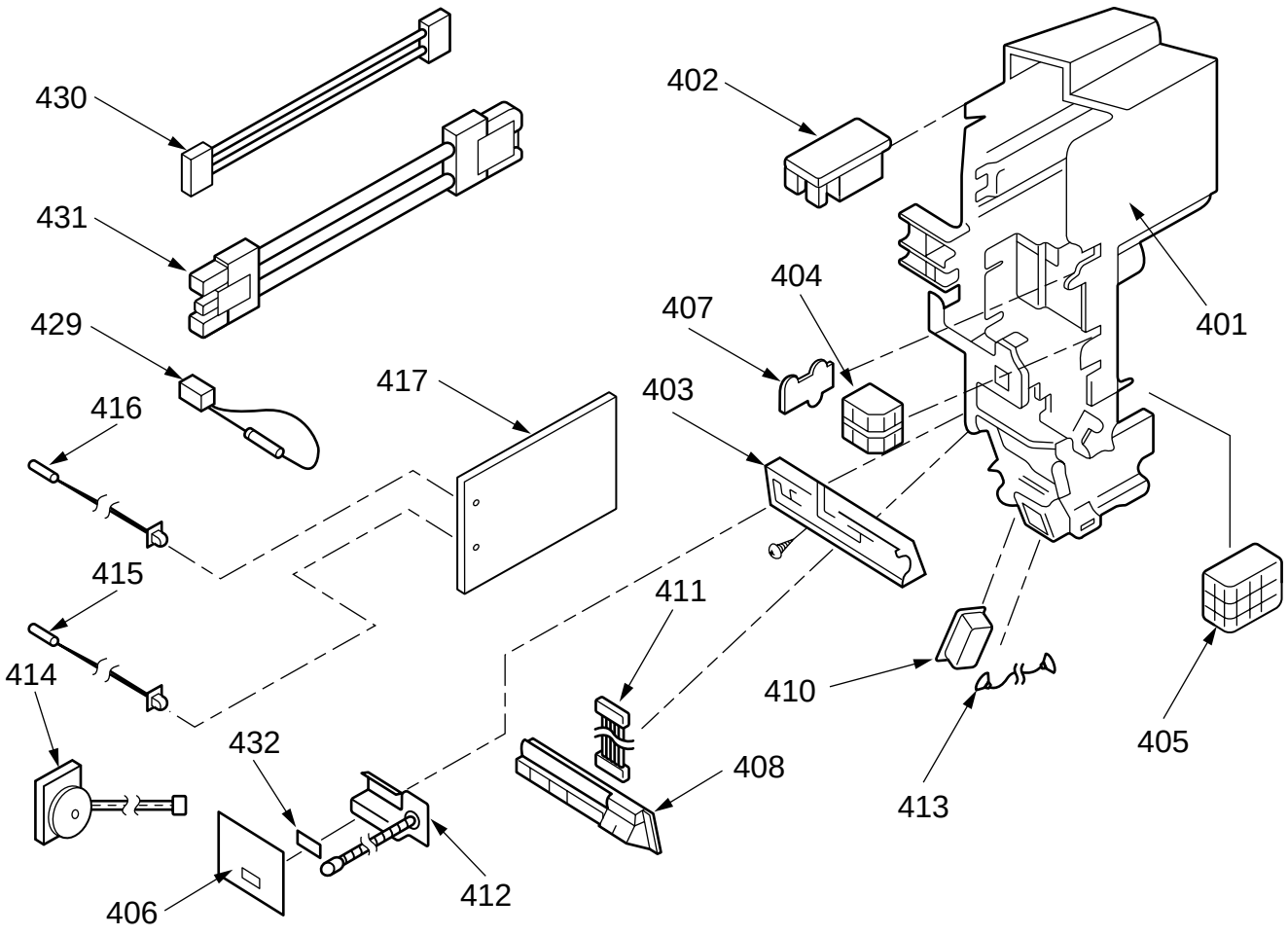
9-4. How to Check the Remote Control (Including the Indoor P.C. Board)


There is no beep from the indoor unit. The operation lamp of the air conditioner main unit does not light.
Push the START/STOP button.
Does the transmission indicator flash?
NO
YES
Short-circuit the metal terminal at the side of the battery compartment (all-clear terminal) with a pencil. (wait about 10 seconds)
Is there direct sunlight on the receptor of the air conditioner?
NO
YES
Is there any thyristor fluorescent light near by?
NO
YES
NO
Is operation possible when the transmitter is moved nearer to the infrared signal receiver of the air conditioner?
YES
Battery life
Push the START/ STOP button
Does the transmission indicator light?
NO
YES
Is operation possible when setting the temporary switch of the air conditioner main unit to "TEST RUN" or "TEMPORARY AUTO"?
NO
YES
NO
Is there any beep and operation?
YES
Can any signal tone be heard in a transistor radio when transmitting within 5cm distance from the radio?
NO
YES
P.C. board is failure.
Remote control is failure.
Avoid direct sunlight.
Keep the air conditioner away from thyristor fluorescent light.
Replace P.C. board.
Replace the batteries
Normal
Replace remote control.

Note: After battery replacement, shortcircuit the metal terminal at the side of the battery compartment (all-clear terminal) with a pencil.

10. EXPLODED VIEWS AND PARTS LIST

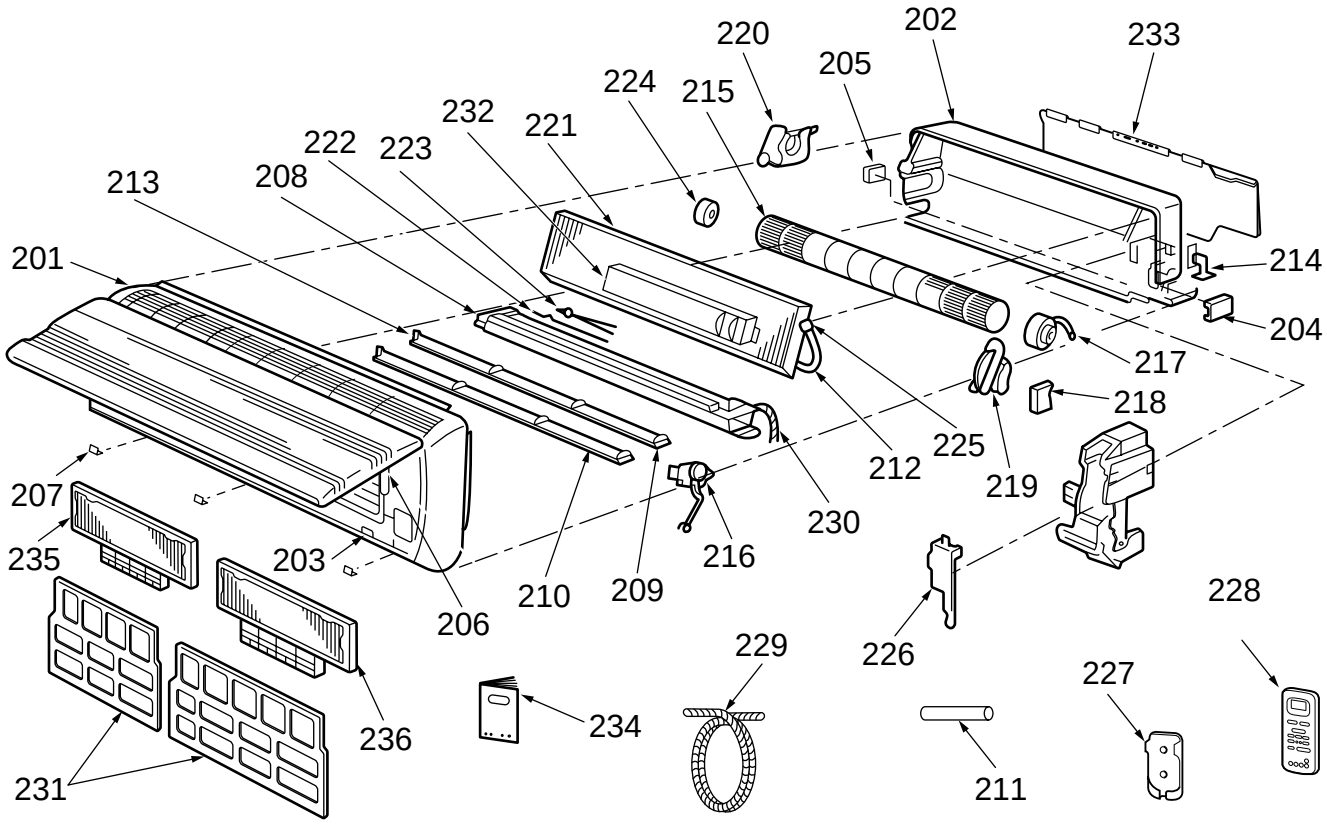
10-1. Indoor Unit (1)



Location No.	Part No.	Description
401	43061192	Base, E-Parts
402	43T69022	P.C. Board Assembly, Transformer MCC-602
403	43T61003	Base, Display
404	43T60001	Terminal Block, 2P
405	43T60002	Terminal Block, 3P
406	43T08105	Plate, Switch
407	43T63020	Holder, P.C. Board
408	43T69021	Display Assembly, LED
410	43T69019	Receiver, Infrared Rays, DK12
411	43T60032	Lead Assembly, Display, 9P
412	73T63021	P.C. Board, Assembly, Switch, MCC-577

Location No.	Part No.	Description
413	43T60060	Cable Assembly, 3P
414	43T37002	P.C. Board, Assembly, Buzzer, MCC460
415	43T69004	Sensor, Heat Exchanger
416	43T69005	Sensor, Thermostat
417	43T69056	P.C. Board, Assembly, MCC-1293
429	43T60041	Fuse Set, Thermal
430	43T60059	Housing Assembly, Secondary
431	43T60058	Housing Assembly, Primary
432	43T62028	Sheet Switch

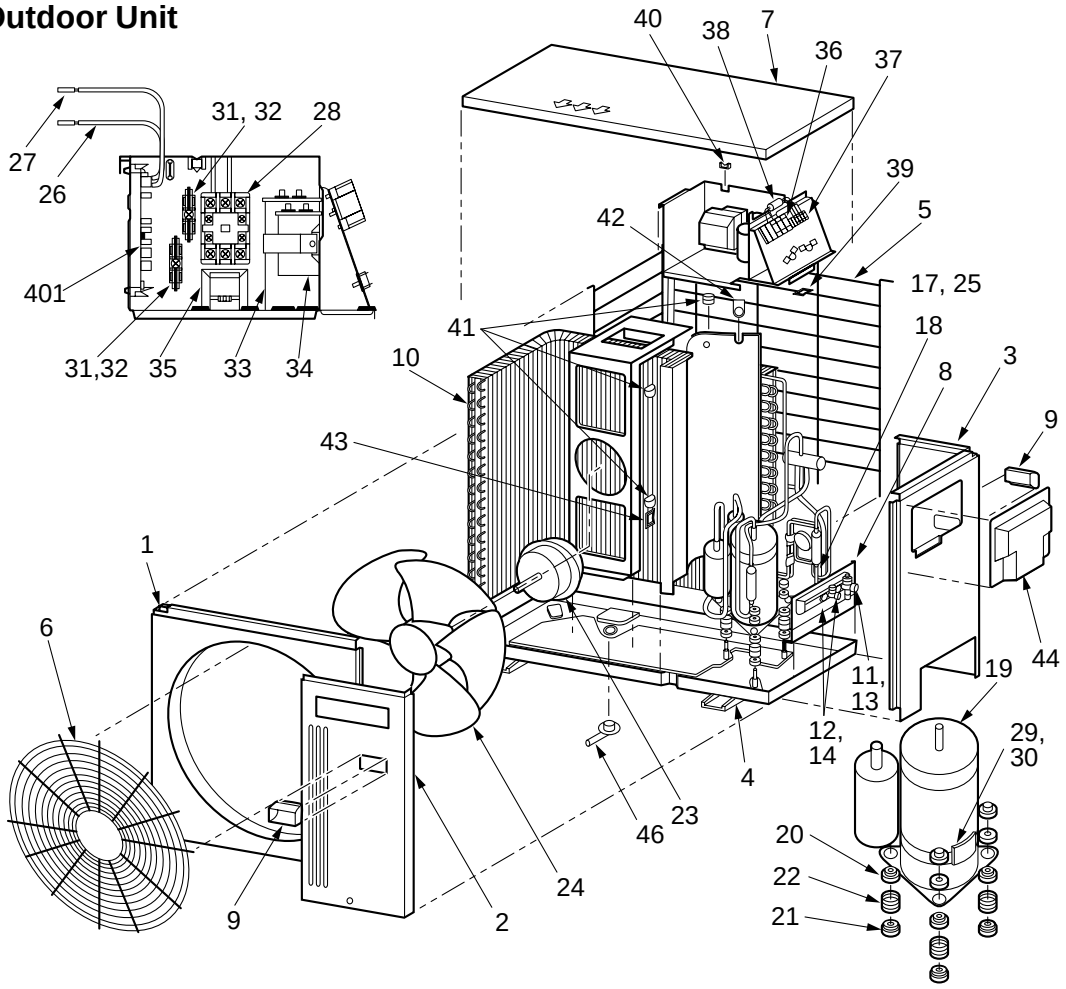
Indoor Unit (2)



Location No.	Part No.	Description
201	43T03009	Panel Assembly, Front
202	43T03003	Body, Back, Assembly
203	43007181	Latch, Plastic
204	43T19015	Bushing, Body (Right)
205	43T19016	Bushing, Body (Left)
206	43T07019	Arm
207	43T07013	Cap, Screw
208	43009535	Grille assembly
209	43T09030	Grille
210	43T09031	Grille, Sub
211	43T11002	Pipe, Shield
212	43T11001	Pipe, Seald
213	43T07010	Bushing
214	43T49033	Holder, Pipe
215	43T20013	Fan, Cross Flow, CJ952
216	43T07012	Arm, Grille, Assembly
217	43T21026	Motor, Fan, AC200V240V, 50Hz, AFP-220-31-4B
218	43T39001	Band, Motor (Right)

Location No.	Part No.	Description
219	43T39013	Band, Motor (Left)
220	43T39014	Base, Bearing
221	43T44019	Evaporator
222	43T47006	Pipe, Delivery
223	43T47016	Pipe, Suction
224	43T22008	Bearing
225	43T19003	Holder, Sensor
226	43T62025	Cover, Electorical Parts
227	43T63002	Holder, Remote Control
228	43T69058	Remote Control
229	43T70005	Hose, Drain, 3M
230	43070168	Hose, Drain
231	43T80008	Air, Filter
232	43T19017	Frame, Main
233	43T82006	Plate, Assembly, Installation
234	43T85060	Owner's Manual
235	43080401	Frame, A, Filter
236	43080402	Frame, B, Filter

10-2. Outdoor Unit



Location No.	Part No.	Description
01	43T00024	Panel, Air Outlet
02	43T00025	Panel, Front
03	43T00026	Panel, Side
04	43T42002	Base Assembly
05	43T19012	Guard, Fin
06	43T19011	Guard, Fan
07	43T91001	Plate, Roof
08	43T42005	Plate, Valve, Packed
09	43T15001	Handle
10	43T43023	Condenser Assembly
11	43T46027	Valve, Packed 12,7
12	43T46016	Valve, Packed 6,35
13	43T47020	Bonnet
14	43T47018	Bonnet
15	43T47007	Tube, Capillary, 1,2DIA
16	43T47014	Tube, Capillary, 1,7DIA
17	43146482	Valve, 4 Way
18	43T46005	Valve, Checked
19	43141301	Compressor, PH280X3-4MS
20	43T49011	Base, Spring, A
21	43T49012	Base, Spring, B
22	43T49019	Spring, Buffer
23	43T21013	Motor, Fan, AC220–240V, 50Hz

Location No.	Part No.	Description
24	43T20010	Fan, Propeller, 490
25	43T46018	Coil, V-4 Way AC220–240V, LB6
26	43T69059	Sensor
27	43T69060	Sensor, TD
28	43T52004	Switch, Magnet, FC-2S
29	43157238	Heater, Crank case
30	43193065	Spring
31	43T60071	Fuse
32	43T60029	Fuse Set, 30A, 250V
33	43T55021	Capacitor, 45MFD, 420V
34	43T55014	Capacitor, 3,5MFD, 450V
35	43T58008	Transformer, FT-67
36	43T60035	Terminal Block, 4P
37	43T60036	Terminal Block, 3P, 30A
38	43T60037	Filter, Clamp
39	43T62014	Protector, Cord
40	43T62015	Protector, Cord
41	43T96003	Clip, Cable
42	43T96001	Bushing
43	43T96004	Bushing, Cord
44	43T62013	Cover, E-Parts
46	43T79004	Nipple, Drain
401	43T69057	P.C. Board Assembly, MCC-1275

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